

CHAPTER

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Fire Protection

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FIRE PROTECTION - INTRODUCTION

Purpose

The fire protection systems monitor the airplane for these conditions:

- Fire
- Smoke
- Overheat
- Pneumatic duct leaks.

Fire/Overheat Detection

The airplane has these fire/overheat detection systems:

- Engine overheat detection
- Engine fire detection
- APU fire detection
- Wheel well fire detection
- Wing/Body overheat detection
- Cargo compartment smoke detection
- Lavatory smoke detection.

Extinguishing

The airplane has these fire extinguishing systems:

- Engine
- APU
- Lavatory
- Cargo compartment
- Portable fire extinguishers.

Abbreviations and Acronyms

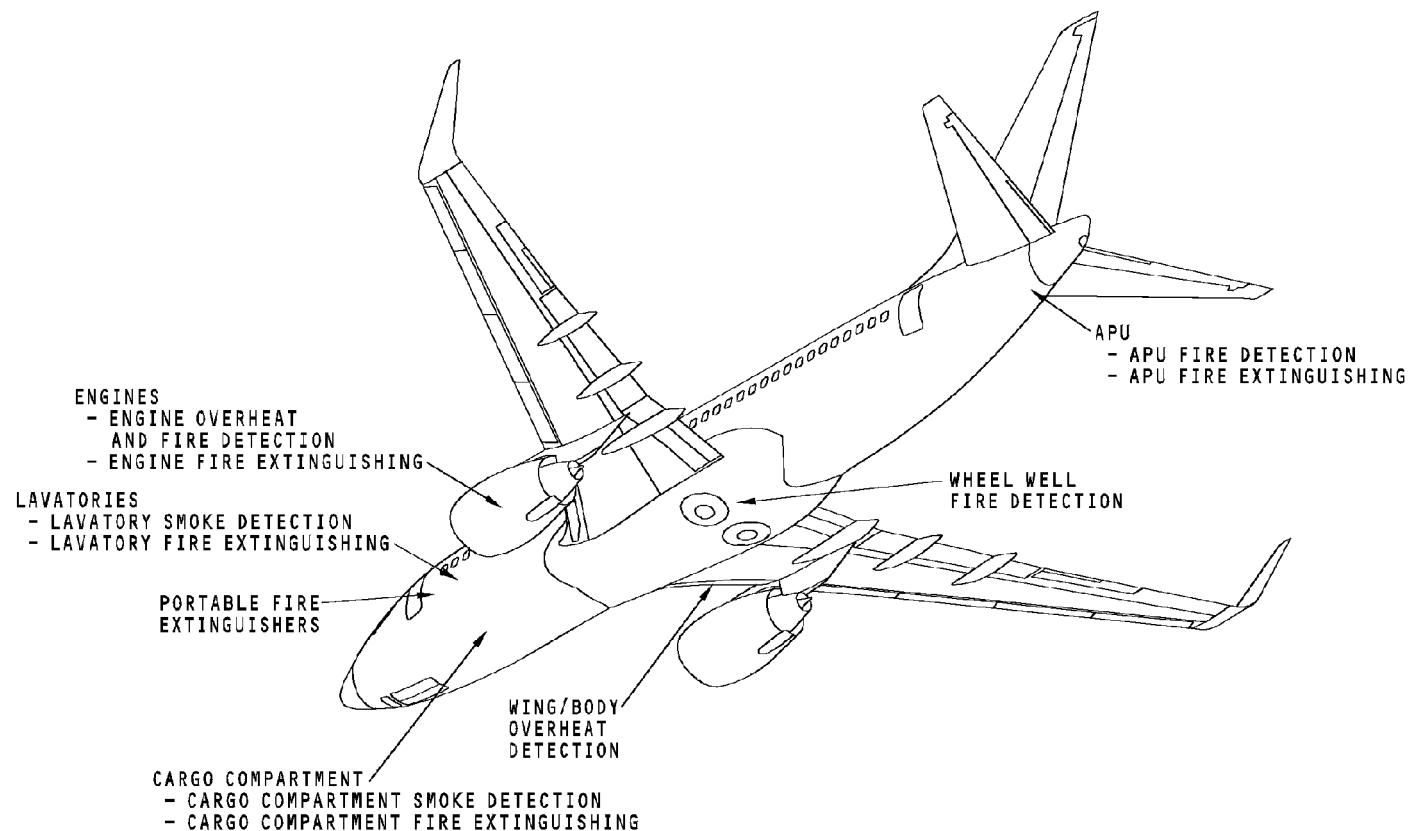
- adv - advisory
- APU - auxiliary power unit
- BITE - built in test equipment
- det - detector
- DV - Distinguished Visitor
- E/E - electronic equipment
- ENG - engine
- ext - extinguish
- HMU - hydro-mechanical unit
- hyd - hydraulic
- inop - inoperable
- LED - light emitting diodes
- LOC - local
- lts - lights
- maint - maintenance
- MD&T - master dim and test
- mem - memory
- MLG - main landing gear
- ovht - overheat
- PA - passenger address
- ref - reference
- rev - reverser
- typ - typical
- vlv - valve
- warn - warning
- W/W - wheel well

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FIRE PROTECTION - INTRODUCTION

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FIRE PROTECTION - FIRE ALARMS - FUNCTIONAL DESCRIPTION

Purpose

The fire alarms provide visual and aural indication to the flight crew about a fire in any of these systems:

- Engine 1
- Engine 2
- APU
- Forward cargo compartment
- Aft cargo compartment
- Main wheel well.

Visual and Aural Indications

When there is a fire, these are the visual and aural indications:

- Two red FIRE WARN lights on the P7 panel come on
- Bell in the aural warning unit comes on
- Red light and horn on alternately in the right main wheel well come on (APU fire only). (The horn does not come on in flight.)

Functional Description

When there is a fire in the engine, the engine and APU fire detection module provides a ground for the two red FIRE WARN lights and the bell.

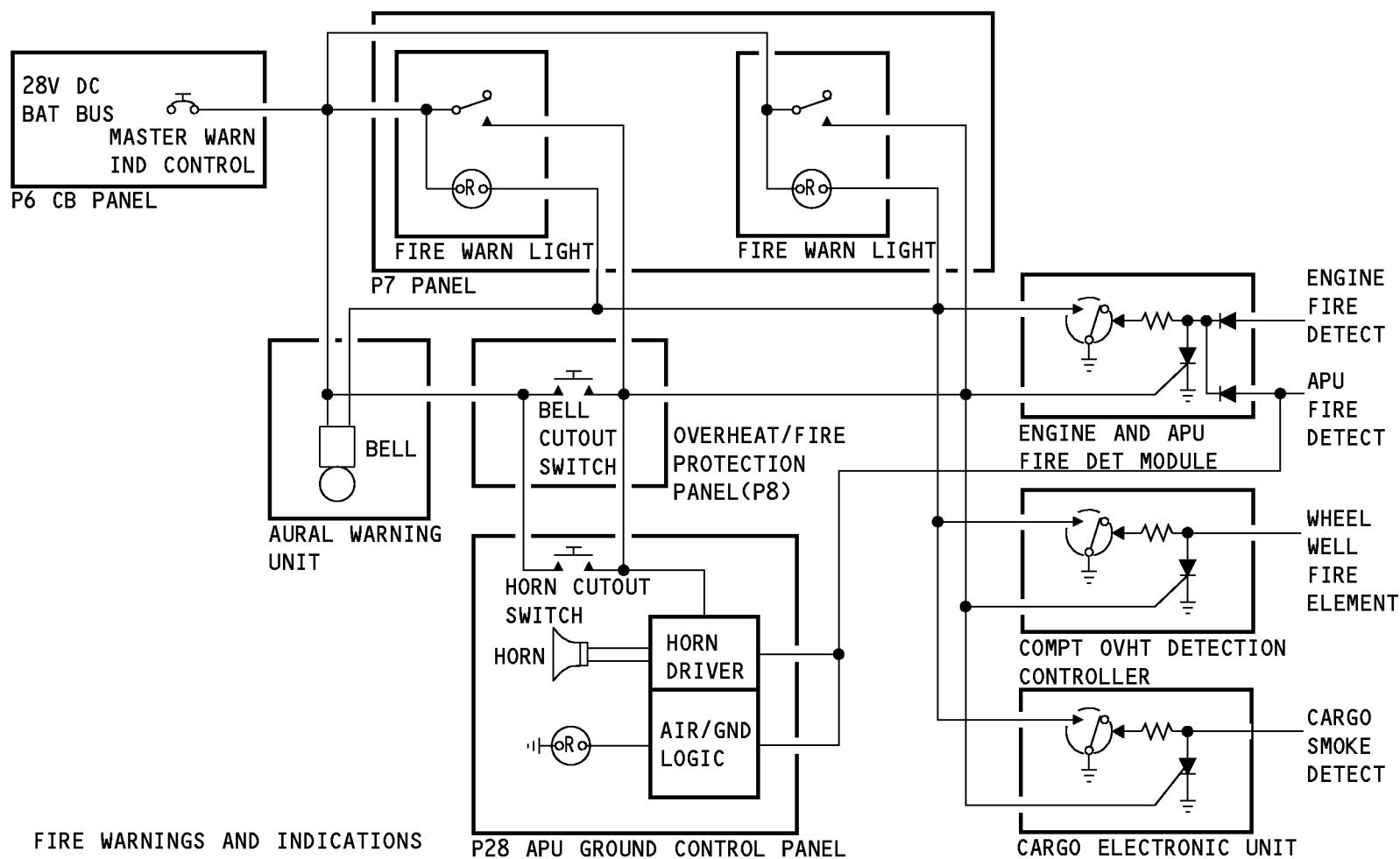
When there is a fire in the APU, the engine and APU fire detection module provides a ground for the two red FIRE WARN lights and the bell. The same module provides power for the red light and horn on the P28 panel.

When there is a fire in the main wheel well, the compartment overheat detection controller provides a ground for the two red FIRE WARN lights and the bell.

When there is smoke in the forward or aft cargo compartment, the cargo electronic unit provides a ground for the two red FIRE WARN lights and the bell.

The two red FIRE WARN lights, bell, and horn are reset by removal of the ground. The reset is done by a momentary push on one of these:

- Left FIRE WARN light
- Right FIRE WARN light
- Bell cutout switch on P8
- Horn cutout switch on the P28 panel.



NOTE: FIRE WARNINGS AND INDICATIONS ARE DUPLICATED FOR BOTH CAPTAIN AND FIRST OFFICER ON EACH OFFICER'S PANEL.

FIRE PROTECTION - FIRE ALARMS - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - ENGINE FIRE DETECTION - INTRODUCTION**Purpose**

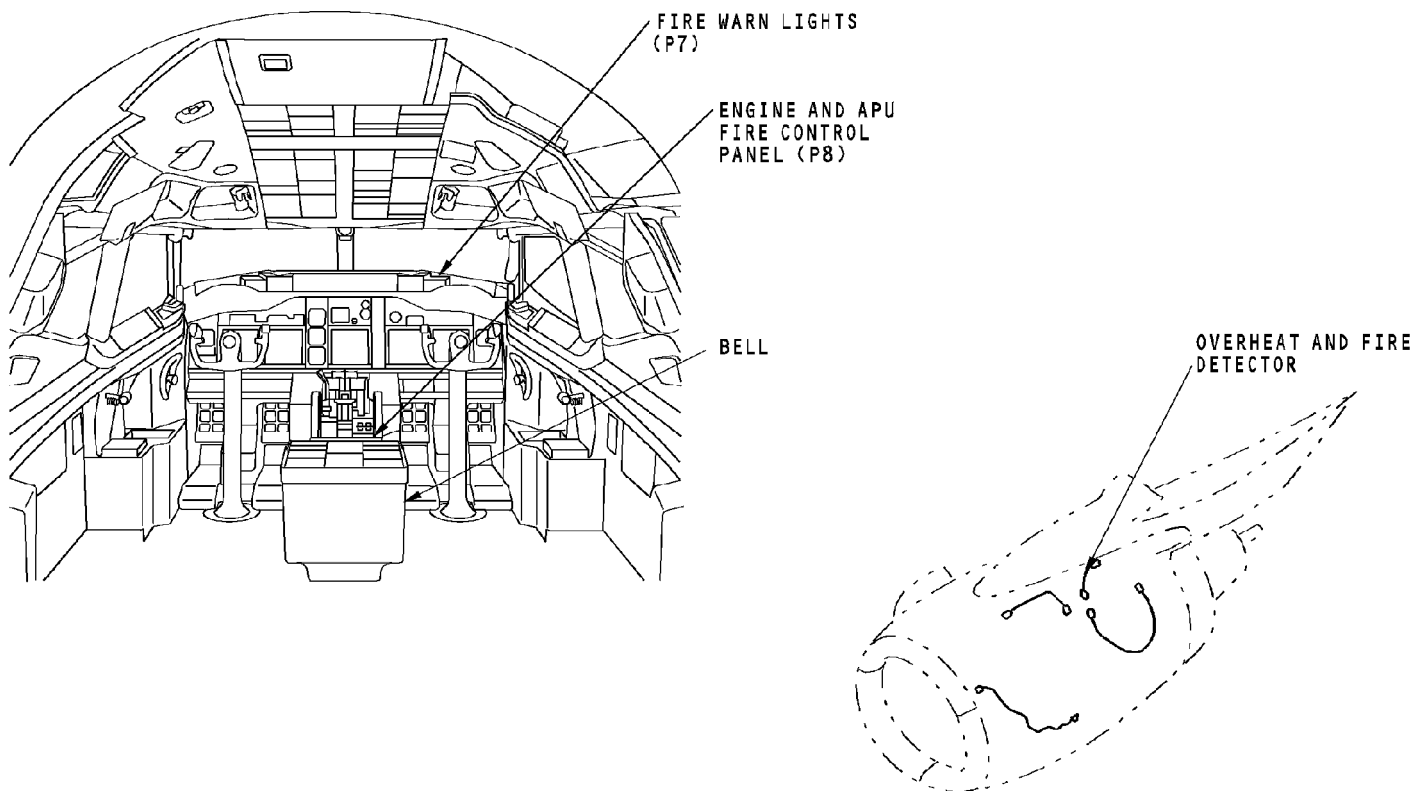
The engine overheat and fire detection system uses detectors on the engine. The detectors monitor engines for overheat and fire conditions. When the system senses an overheat or a fire condition, alarm indications operate in the flight compartment. The indications are on the P7 glareshield panel and on the engine and APU fire control panel. A bell also operates in the flight compartment for an engine fire.

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FIRE PROTECTION - ENGINE FIRE DETECTION - INTRODUCTION

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FIRE PROTECTION - ENGINE FIRE DETECTION - GENERAL DESCRIPTION

General Description

These are the components for engine overheat and fire:

- Engine overheat/fire detector (loop A and loop B)
- Engine and APU fire detection module
- Glareshield, P7 panel
- Engine and APU fire control panel
- Aural warning unit.

Overheat/fire detectors on the engine send signals to the engine and APU fire detection module. This module will supply aural and visual indications in the flight compartment.

The engine and APU fire detection module gives visual indications for detector faults on the module and the engine and APU fire control panel panel.

Overheat/fire test

You use the TEST switch on the engine and APU fire control panel. In the OVHT/FIRE position, the indications in the flight compartment are the same as for the real fire condition. If the test fails, use the engine and APU fire detection module to isolate the fault.

NOTE: During the engine overheat/fire test, the APU fire and wheel well fire circuits are also tested.

Fault/inop test

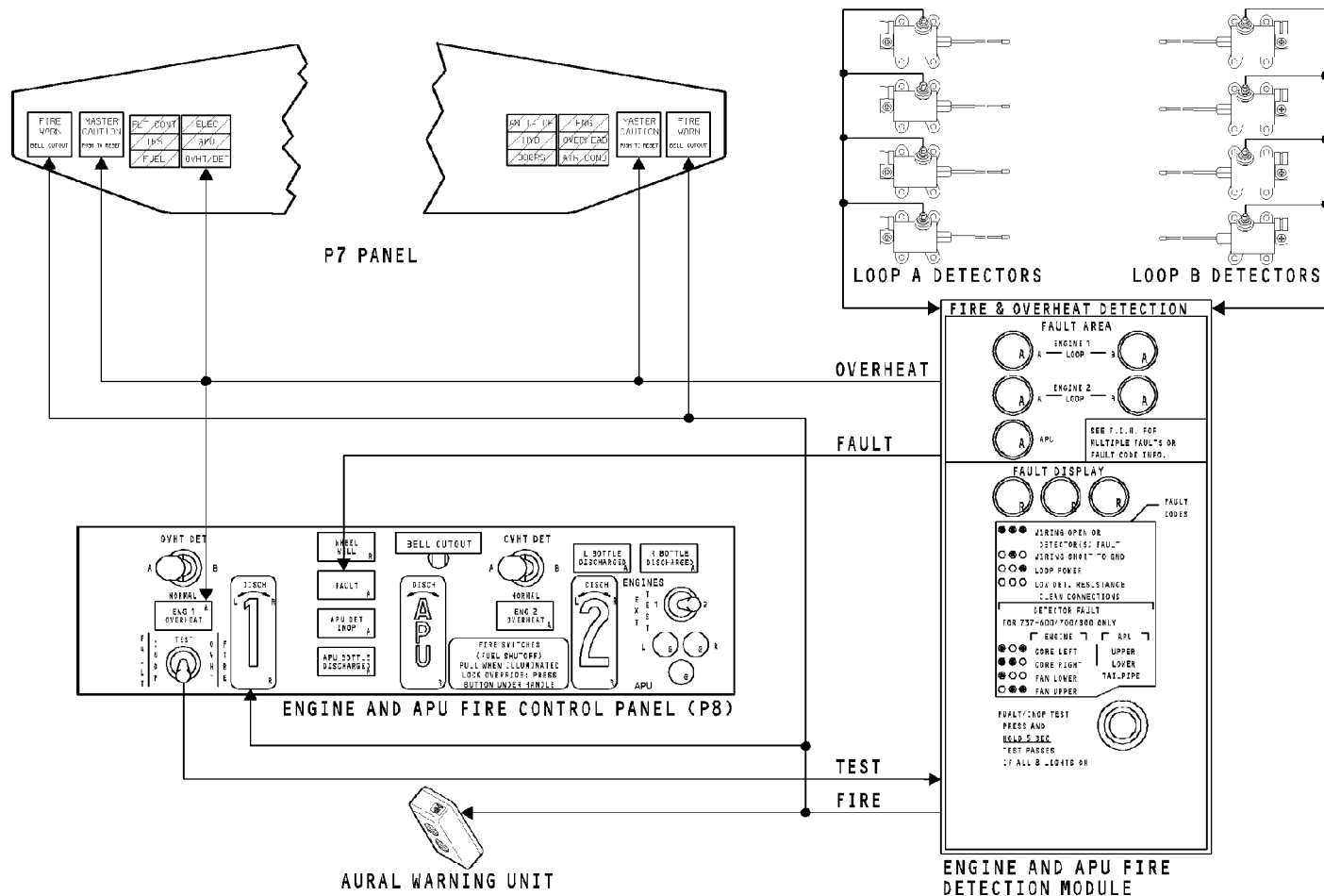
You use the TEST switch on the engine and APU fire control panel. In the FAULT/INOP position, the indications in the flight compartment are the same as a real fault condition. If the test fails, use the engine and APU fire detection module to isolate the fault.

NOTE: During engine fault test, the APU fire detector fault circuit is tested.

Single Loop Operation

If an engine overheat/fire detector fails to operate, the engine and APU fire detection module automatically changes to single loop operation. In the single loop mode, only one loop must detect an overheat or fire condition for the engine and APU fire detection module to give the alarm condition.

There is no indication in the flight compartment of single loop operation until you do the OVHT/FIRE test.



FIRE PROTECTION - ENGINE FIRE DETECTION - GENERAL DESCRIPTION

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FIRE PROTECTION - ENGINE FIRE DETECTION - ENGINE FIRE DETECTORS

Purpose

The engine fire detectors monitor for high temperatures in the engine area.

General Description

Each engine has eight detectors. The detectors monitor four sections of the engine. In each section, two detectors attach to a support tube and make an assembly. An assembly has one detector from loop A and one from loop B.

Physical Description

The engine fire detectors have these parts:

- Overheat, fire, and fault pressure switches
- Resistors
- Terminal stud
- A stainless steel, gas charged tube.

Location

These are the locations of the engine fire detectors:

- Two on the upper fan case section
- Two on the lower fan case section
- Two on the left core section
- Two on the right core section.

Detector Characteristics

This table shows the temperature characteristics of the detectors.

Detector Location	Overheat	Fire
Upper Fan Case	345F (174C)	580F (304C)
Lower Fan Case	345F (174C)	580F (304C)
Left Core Section	650F (343C)	850F (454C)
Right Core section	650F (343C)	850F (454C)

Operation

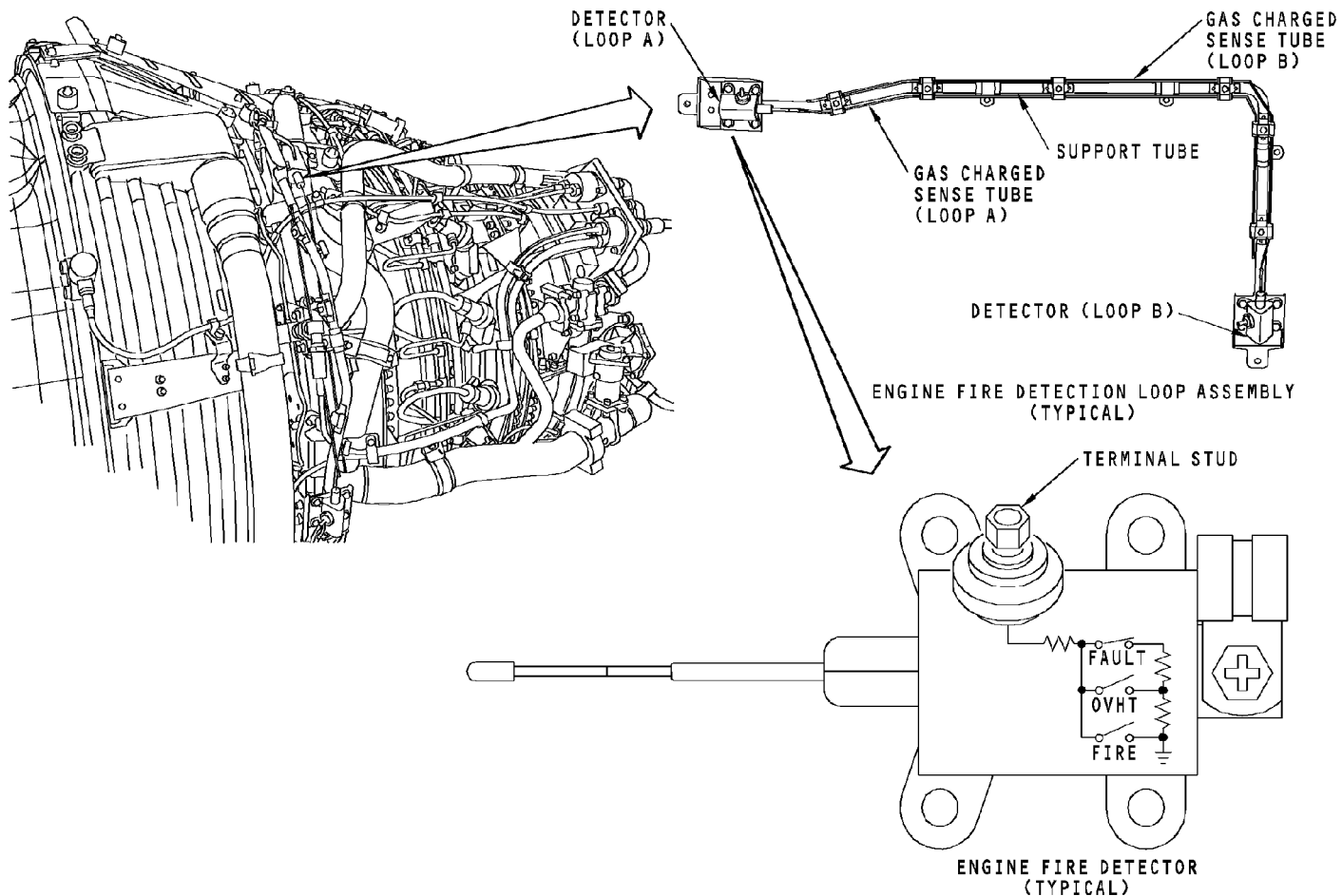
The three pressure switches sense these conditions:

- Overheat
- Fire
- Fault (loss of gas pressure).

Gas pressure in the sense tube holds the fault pressure switch in the closed position. The other two pressure switches close when the gas pressure increases because of an overheat or fire condition.

The overheat and fire signals go to the engine and the APU fire detection module. This module supplies overheat or fire indication in the flight compartment.

If the pressure in the sense tube decreases, the fault switch opens. This switch sends the fault signal to the engine and APU fire detection module.



FIRE PROTECTION - ENGINE FIRE DETECTION - ENGINE FIRE DETECTORS

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FIRE PROTECTION - ENGINE FIRE DETECTION - ENGINE AND APU FIRE DETECTION MODULE

Purpose

The engine and APU fire detection module monitors detectors for overheat and fire conditions on the engine. Also it monitors for fire conditions on the APU.

Physical Description

The control circuits for the engine overheat and fire, and the APU fire detection are in the module. The front panel has these components:

- ENGINE 1 LOOP A amber fault light
- ENGINE 1 LOOP B amber fault light
- ENGINE 2 LOOP A amber fault light
- ENGINE 2 LOOP B amber fault light
- APU amber fault light
- Three red FAULT DISPLAY lights
- FAULT/INOP test switch.

Location

The engine and APU fire detection module is on the electronic equipment compartment on the E2-2 shelf.

Operation

During normal conditions, all front panel lights are off. When a fault condition occurs, the related FAULT AREA light comes on. The FAULT DISPLAY lights show a fault code.

When you push the FAULT/INOP test switch, faults are simulated to do a check of the circuit ability to detect a fault. If the circuits operate correctly, all lights on the front panel come on. If a light does not come on, it shows a faulty circuit operation.

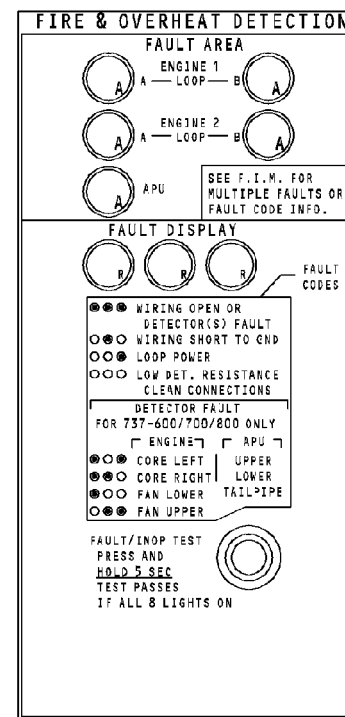
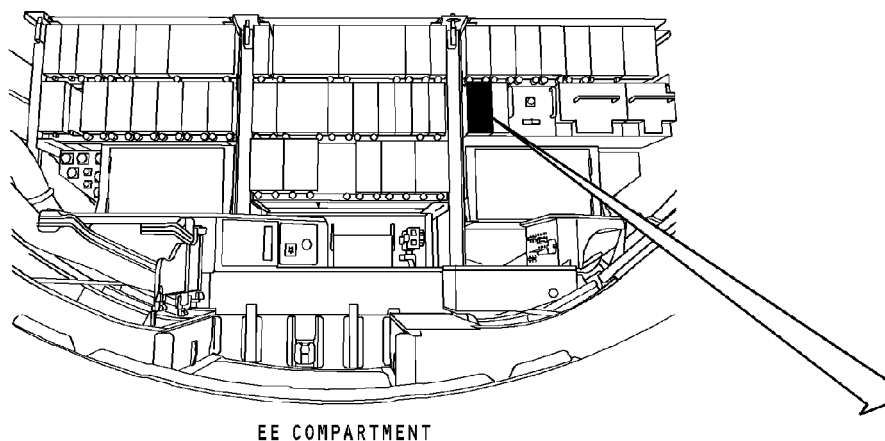
The FAULT DISPLAY lights show the type of fault and the detector location.

Fault Signal Priorities

When there are multiple engine loop faults (two or more amber lights on), this is the display priority:

Highest Priority	Engine 1	Loop A
	Engine 1	Loop B
	Engine 2	Loop A
	Engine 2	Loop B
Lowest Priority	APU	

If there is more than one fault, the lower priority fault does not show until you isolate the higher priority fault.



ENGINE AND APU FIRE DETECTION MODULE (E2-2)

FIRE PROTECTION - ENGINE FIRE DETECTION - ENGINE AND APU FIRE DETECTION MODULE

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FIRE PROTECTION - ENGINE FIRE DETECTION - FUNCTIONAL DESCRIPTION

Functional Description

The OVHT DET switch on the engine and APU fire control panel permits selection of the mode of operation. Each switch has these positions:

- NORMAL - makes loop A and loop B agree before the alarm condition operates
- A - makes loop A the only sense authority
- B - makes loop B the only sense authority.

At the overheat temperature set point, the gas expands in the detector and closes the OVERHEAT pressure switch. This decreases the resistance of the detector.

The engine and APU fire detection module uses this decrease in resistance to set the overheat condition. These are the results of an overheat condition:

- MASTER CAUTION and OVHT/DET annunciator lights come on
- Related engine fire handle switch unlocks
- Related ENG OVERHEAT light comes on.

At the fire temperature set point, the gas expands more to close the FIRE pressure switch in the detector. This decreases the resistance further.

The engine and APU fire detection module uses this signal to set the fire condition. These are the results of a fire condition:

- Two red FIRE WARN lights
- Aural warning unit bell
- Related engine fire warning switch lights
- Related overheat indications stay on.

The FAULT/INOP test does a check of the module fault detection circuitry and related flight compartment indications. These are the indications of a good FAULT/INOP test:

- MASTER CAUTION and OVHT/DET annunciator lights come on
- Amber FAULT light comes on
- Amber APU DET INOP light comes on
- All FAULT AREA display lights on the engine and APU fire detection module come on
- All FAULT DISPLAY lights on the engine and APU fire detection module come on after five seconds.

NOTE: YOU CAN ALSO DO THE FAULT INOP TEST AT THE ENGINE AND APU FIRE DETECTION MODULE. THE INDICATIONS IN THE FLIGHT COMPARTMENT WILL BE THE SAME.

The OVHT/FIRE test does a check of the module overheat and fire detection circuitry and flight compartment indications. These are the indications of a good OVHT/FIRE test:

- MASTER CAUTION and OVHT/DET lights come on
- Two red FIRE WARN lights come on
- ENG 1, ENG 2, and APU fire handle switch lights come on
- Amber ENG 1 and ENG 2 OVERHEAT lights come on
- Red WHEEL WELL light comes on (115v ac power is necessary)

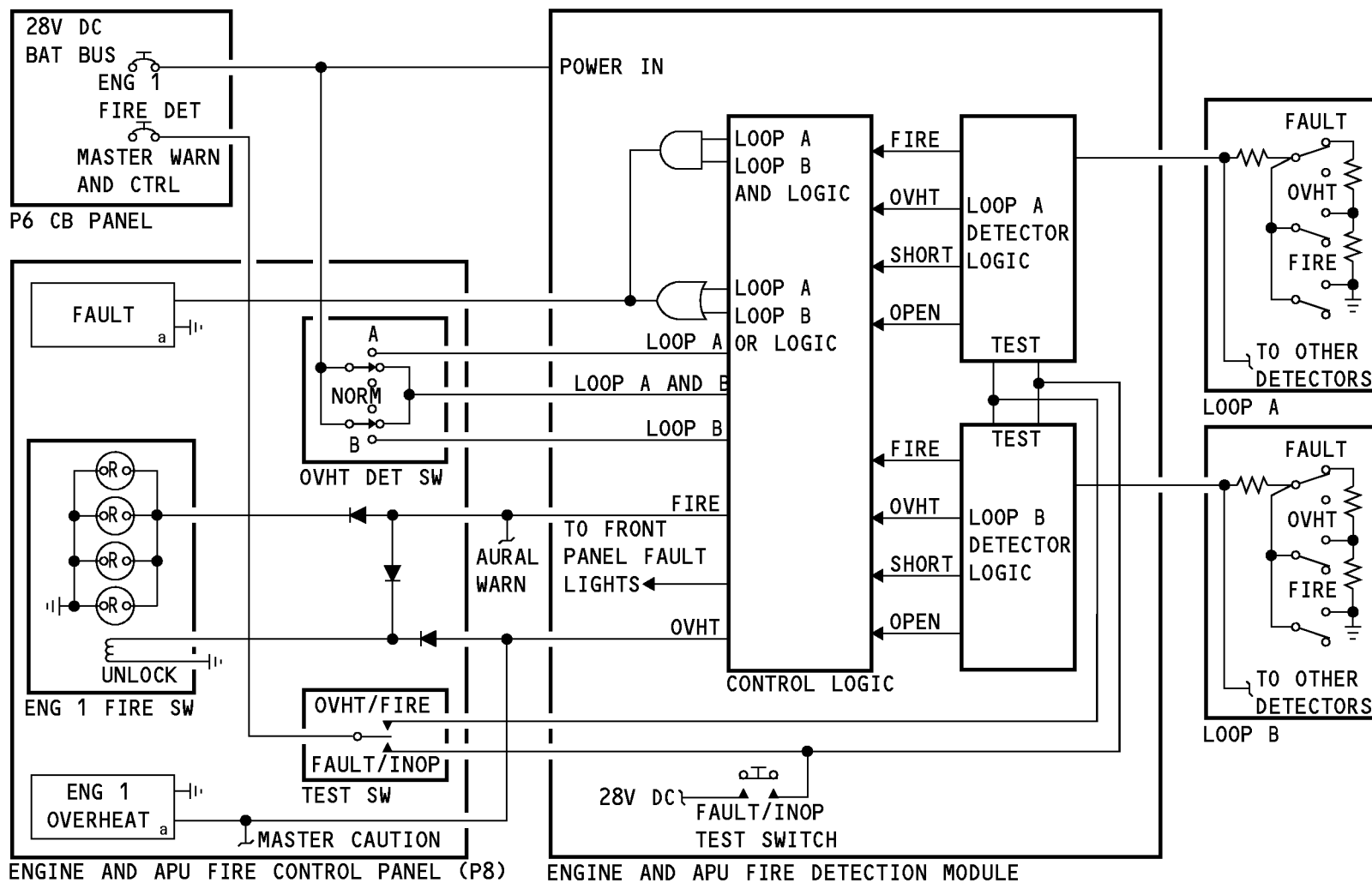
FIRE PROTECTION - ENGINE FIRE DETECTION - FUNCTIONAL DESCRIPTION

- Aural warning unit bell sounds
- APU remote control panel horn and red light come on
- ENG 1, ENG 2, and APU fire handle switches unlock.

Training Information Point

If the OVHT DET switch is in the NORMAL position, the two loops on one engine must have a fault condition before the FAULT light comes on.

NOTE: The MASTER CAUTION indication does not come on with the FAULT light.



NOTE: ONLY ENG 1 DETAILS ARE SHOWN FOR CLARITY ON P8.

FIRE PROTECTION - ENGINE FIRE DETECTION - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - INTRODUCTION

Purpose

The lavatory smoke detection system alerts the cabin crew to smoke conditions in the lavatories. A smoke detector is in the ceiling of each lavatory.

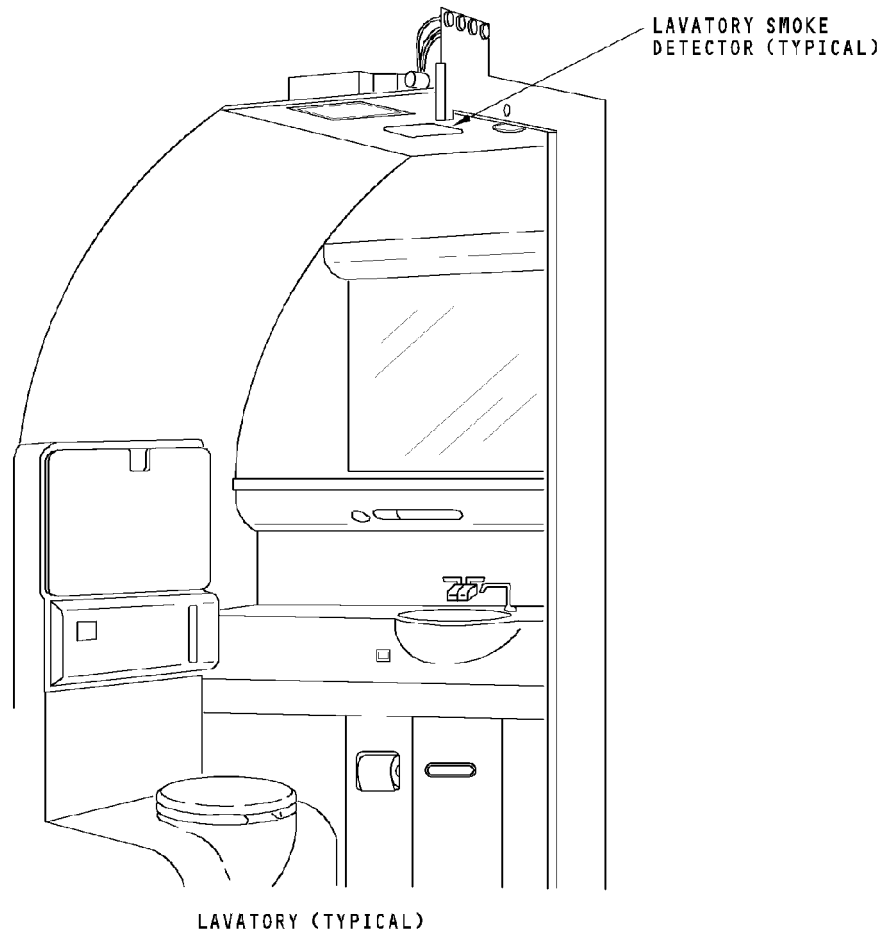
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FIRE PROTECTION - LAVATORY SMOKE DETECTION - INTRODUCTION

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - GENERAL DESCRIPTION

General

The smoke detection system gives aural and visual alarm indications when smoke is detected in a lavatory.

Interfaces

The lavatory smoke detector has these interfaces:

HAP 001-013, 015-026, 028-054

- Lavatory call circuitry

HAP ALL

- Flight data recorder system

HAP 001-013, 015-026, 028-054, 104-106

- Lavatory smoke detection control panel

HAP ALL

- Electrical power.

HAP 001-013, 015-026, 028-054

Lavatory Call Circuitry

The lavatory call light/reset switch (amber) on the outside of the lavatory and above the door flashes when the detector inside of that lavatory finds smoke. The smoke condition overrides the usual lavatory call indications. See the passenger and lavatory call lights section in the lights chapter for more information about the usual lavatory call indications (SECTION 33-27).

The master lavatory call light (amber) on the forward exit locator sign flashes when a detector finds smoke in a forward lavatory. The master lavatory call light (amber) on the aft exit locator sign flashes when a detector finds smoke in an aft lavatory.

The passenger address system turns on a chime that cycles on/off when a smoke detector finds smoke in a lavatory.

HAP ALL

Flight Data Recorder System

The smoke detection system gives data to the flight data recorder system when any lavatory smoke detector finds smoke.

HAP 001-013, 015-026, 028-054, 104-106

Control Panel Interface

The control panel lets you test the smoke detectors and gives indications when a detector finds smoke.

These indications show on the control panel when a smoke detector finds smoke:

- SMOKE DETECT indicator (red)
- Location indicator (red)
- Internal horn turns on.



FIRE PROTECTION - LAVATORY SMOKE DETECTION - GENERAL DESCRIPTION

HAP 001-013, 015-026, 028-054, 104-106 (Continued)

HAP ALL

Electrical Power

The smoke detection system uses 28v dc from bus 1.

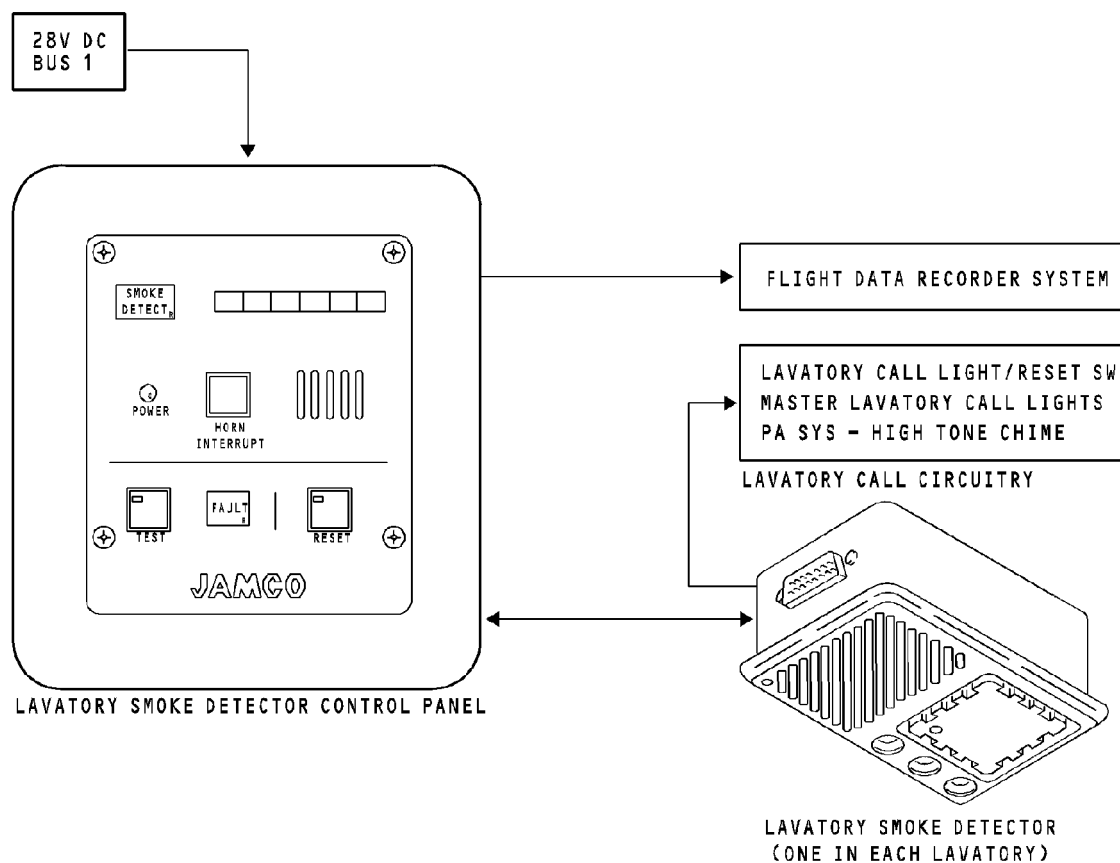
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FIRE PROTECTION - LAVATORY SMOKE DETECTION - GENERAL DESCRIPTION

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HAP 001-013, 015-026, 028-054

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - CONTROL PANEL

Purpose

The control panel monitors the smoke detectors for alarm conditions. If a detector senses smoke in the lavatories, the control panel gives aural and visual signals.

Physical Description

The control panel has these components:

- POWER indicator
- FAULT indicator
- SMOKE DETECT indicator
- Location indicator
- HORN INTERRUPT switch
- Alarm horn
- RESET switch
- TEST switch.

Location

The control panel is at an attendant station.

General Description

A green LED comes on when the system has power. When a detector senses smoke, these indications occur:

- Red SMOKE DETECT indicator comes on
- Red location indicator shows the location of the smoke detector
- Control panel alarm horn sounds.

The horn interrupt switch stops the alarm horn.

The RESET switch returns the system to the stand-by condition.

The TEST switch does checks of the functions of the control panel and the detectors.

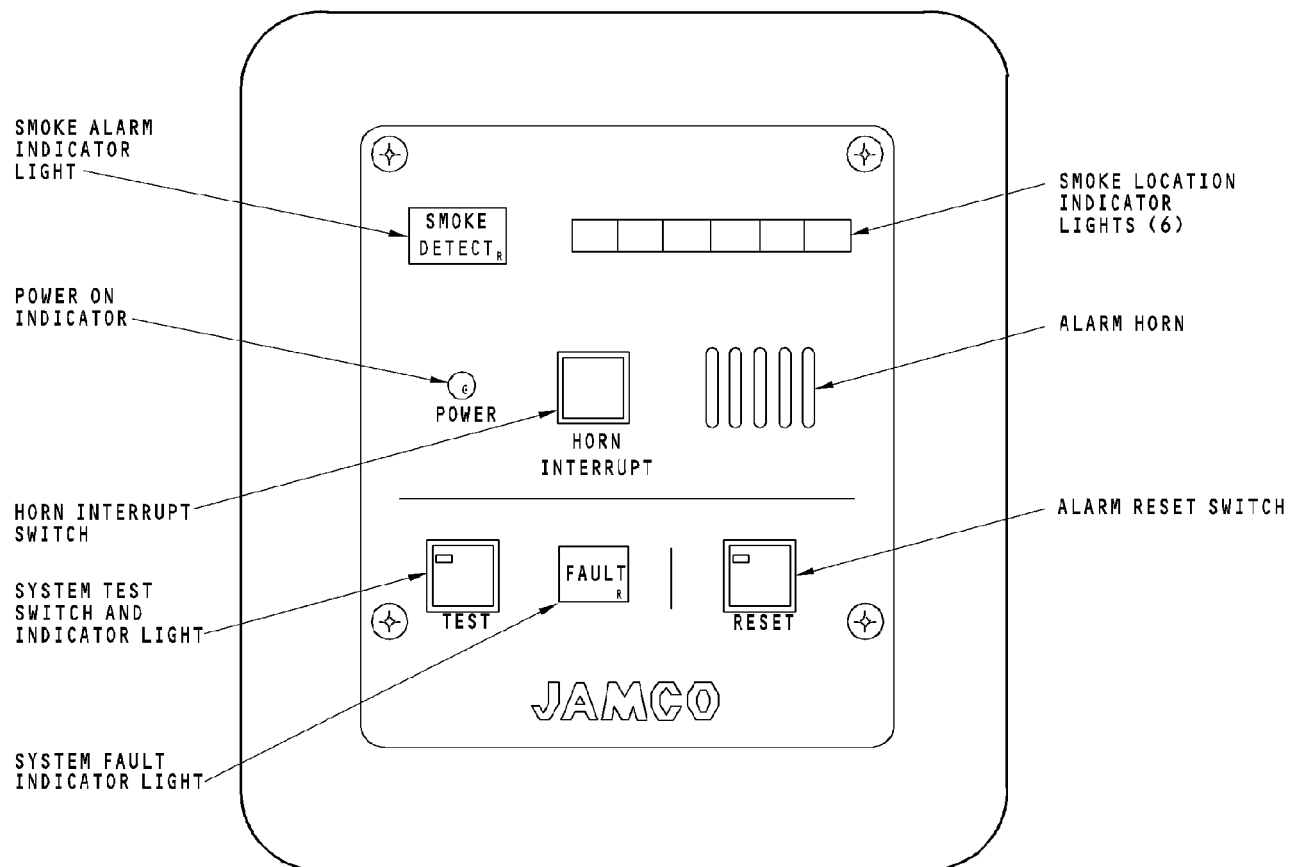
The FAULT indicator comes on if the system test is bad or when a detector is bad. The location indicator shows the location of the bad detector.

EFFECTIVITY

HAP 001-013, 015-026, 028-054, 104-106

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - CONTROL PANEL

EFFECTIVITY

HAP 001-013, 015-026, 028-054, 104-106

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - LAVATORY SMOKE DETECTOR

Purpose

The lavatory smoke detector monitors the lavatory for smoke and gives warnings if there is smoke.

Location

The smoke detector is in the ceiling of each lavatory.

Physical Description

The smoke detector assembly has these components:

- Electrical connector
- Mounting bracket
- Case
- Smoke sensor. The sensor is an LRU and has an alarm LED (red) and an internal filter

HAP 031-036, 050, 054

- Power/interrupt switch

HAP 001-013, 015-026, 028-030, 037-049, 051-053, 101-999

- Internal relays, one for a steady output and one for a pulsating output. These relays can be connected to external indications

HAP ALL

- Cover with two screws.

The smoke sensor is dual chamber ionization type of unit.

Operation

The red alarm LED is ON when the sensor detects smoke. The LED stays ON as long as the detector has power and detects smoke.

HAP 031-036, 050, 054

The internal horn turns ON and stays ON as long as the detector has power and the smoke sensor detects smoke.

Push and hold the interrupt switch to remove power from the detector and to stop all indications. When you release the interrupt switch, all indications will turn ON again if smoke is detected.

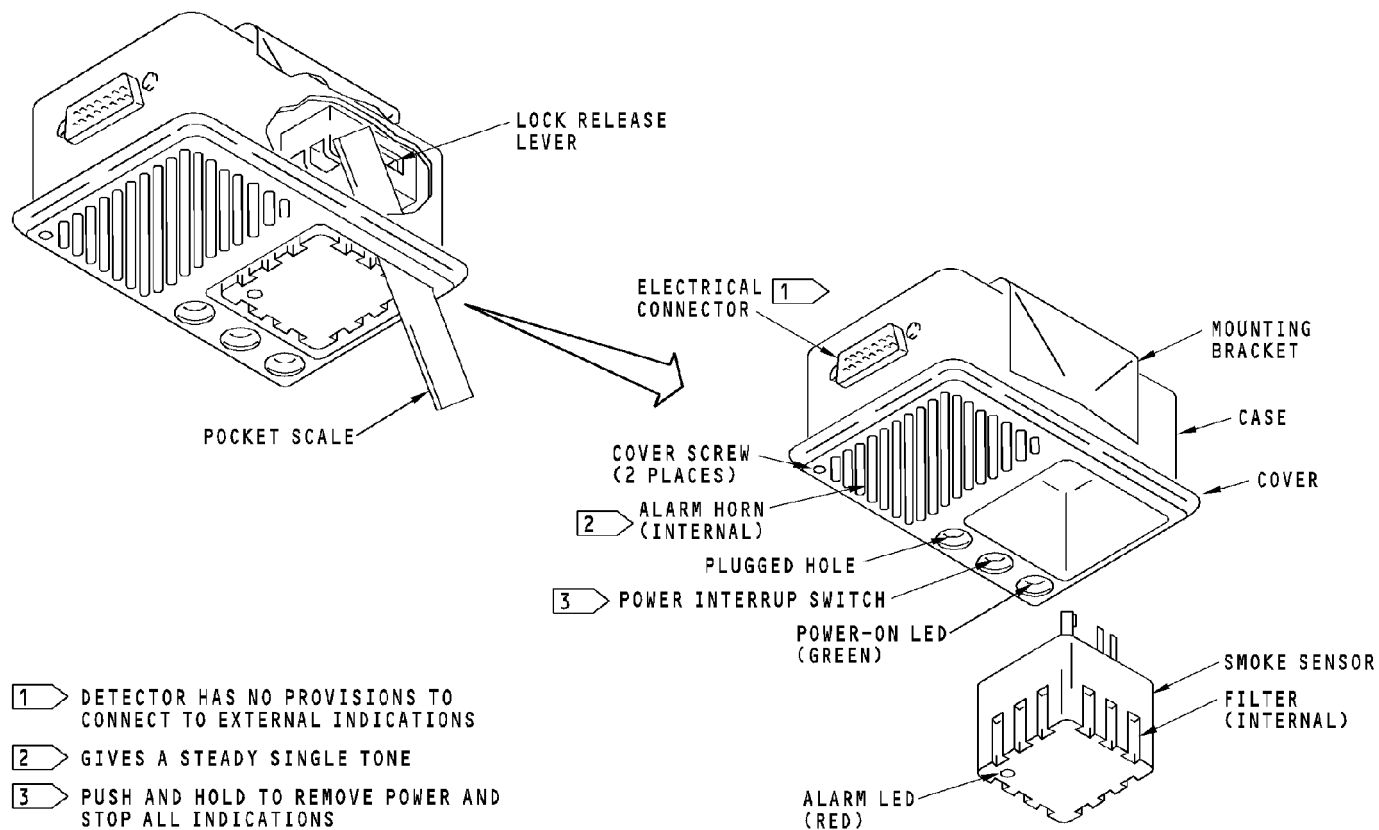
HAP 001-013, 015-026, 028-054, 104-106

The smoke detector has an interface with the lavatory smoke control panel (not shown) for control and indications. See the control panel page in this section for more information.

HAP ALL

Training Information Point

There is a filter inside the smoke sensor. It is necessary to clean the filter periodically. You can remove the smoke sensor without removal of the smoke detector. To remove the smoke sensor, use a pocket scale to move the lock release lever. This will let you take the sensor out of the smoke detector assembly.



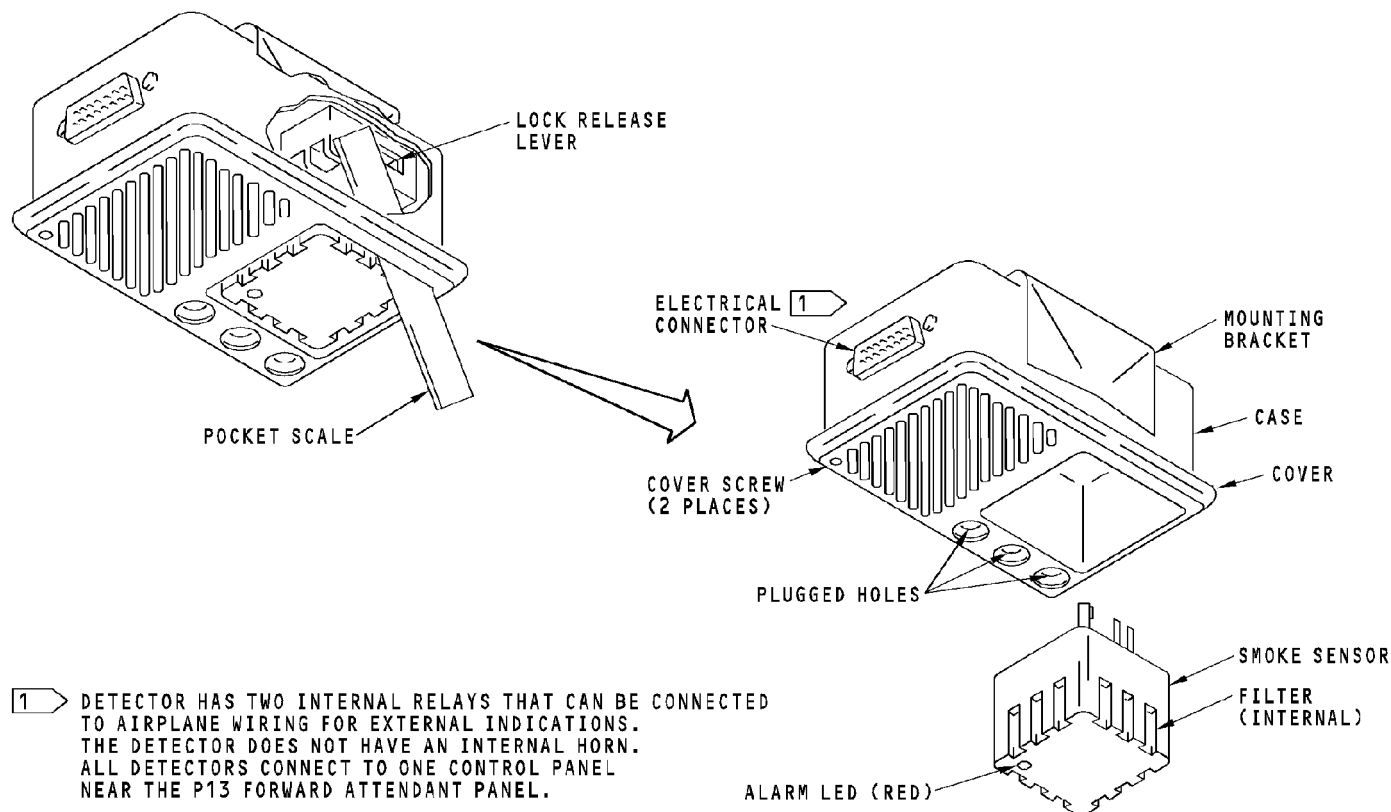
FIRE PROTECTION - LAVATORY SMOKE DETECTION - LAVATORY SMOKE DETECTOR

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HAP 031-036, 050, 054

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - LAVATORY SMOKE DETECTOR

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - FUNCTIONAL DESCRIPTION

Power

HAP 001-013, 015-026, 028-054, 104-106

Bus 1 gives 28v dc for the lavatory smoke detection system. The control panel has a green POWER LED that stays ON when the system has power.

HAP 101-103, 107-999

Bus 1 gives 28v dc for the lavatory smoke detection system. All smoke detectors have a green POWER LED. The LED stays ON when a detector has power.

HAP ALL

Monitoring

The smoke sensor in each detector monitors for smoke density above a preset limit. If the density stays above the limit for appropriately eight seconds, the sensor set the detector to the alarm condition.

Alarm

The alarm condition causes this indication inside of the lavatory: the red alarm LED on the smoke sensor turns on.

HAP 031-036, 050, 054

The alarm condition causes these indications inside of the lavatory:

- The red ALARM LED on the smoke sensor turns on
- The horn inside the smoke detector turns on.

HAP ALL

The alarm condition causes a signal to go these systems/ components for indications outside of the lavatory:

HAP 001-013, 015-026, 028-054

- The lavatory call light (amber)/reset switch above the lavatory door flashes.
- The master lavatory call light (amber) on the forward or aft exit locator sign flashes. The light that flashes relates to the location of the lavatory that has smoke. The forward light flashes for smoke in a forward lavatory and the aft light flashes for smoke in an aft lavatory
- The passenger address systems gives a high tone chime that repeats.

HAP ALL

- The alarm signal goes to the flight data recorder system for stowage.

HAP 001-013, 015-026, 028-054, 104-106

The alarm signal also goes the lavatory smoke detector control panel. The panel gives these indications when any smoke detector gives an alarm:

- An internal horn pulsates on/off
- The SMOKE DETECTOR light (red) flashes
- One of the six locator lights turn on to identify which lavatory has smoke.

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - FUNCTIONAL DESCRIPTION

Reset

HAP 031-036, 050, 054

You use the power INTERRUPT switch on the detector to stop all alarm indications and to reset the smoke sensor. The alarm indications stay off after you release the INTERRUPT switch if the smoke density is below a preset limit. If smoke density is above a preset limit, then the alarm indications turn on again.

HAP 001-013, 015-026, 028-054, 104-106

You use the INTERRUPT switch on the control panel to stop the internal horn and to stop the flashing SMOKE DETECT red light.

You use the RESET switch on the control panel to stop all indications except the red ALARM LED on the smoke sensor for 60 seconds. The ALARM LED turns off and the other alarm indications stay off if smoke density goes below a preset limit within 60 seconds. If smoke density stays above a preset limit after 60 seconds, all alarm indicators turn on again.

HAP ALL

TEST

HAP 031-036, 050, 054

To test that the detector gives the alarm indications, you provide smoke to the sensor.

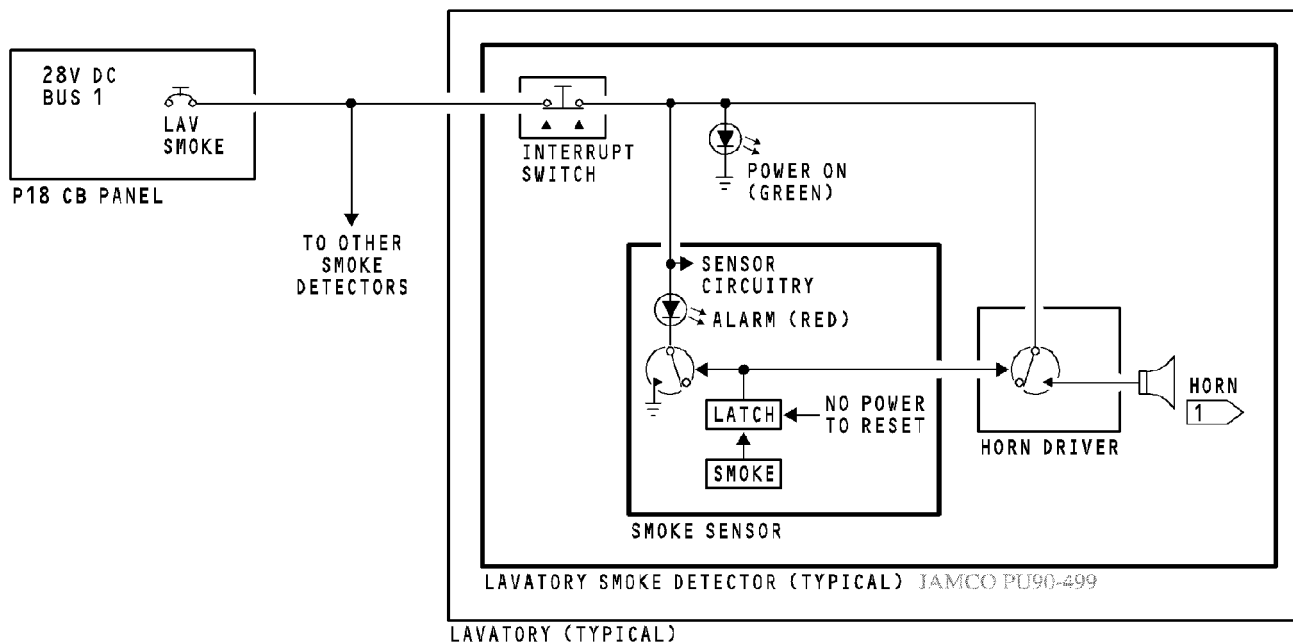
HAP 001-013, 015-026, 028-054, 104-106

To test that a detector gives the alarm indications, you can use the TEST switch or you can provide smoke to the sensor in the detectors.

The TEST switch on the control panel lets you test all detectors at the same time. You push and release the TEST switch to start the test. If all detectors pass the test, the alarm indications turn on. If one or more detectors has a fault or the control panel has a fault, the alarm indications do not turn on. The system can detect two types of faults with a detector: sensor sensitivity is too high or sensitivity is too low. The indication that show on the control panel are different for each type of fault. These are the indications that show when the system has a fault:

- Fault of Detector, Sensitivity is too High. The FAULT light (not shown), the light inside of the TEST switch (not shown) and the LOCATION indicator flash. Push and release the TEST switch to continue the test.
- Fault of Detector, Sensitivity is too Low. The FAULT light (not shown) and the light inside of the TEST switch (not shown) flash and the LOCATION indicator turns on steady. Push and release the TEST switch to continue the test.
- Fault of the Control Panel. The FAULT light (not shown) and the light inside of the TEST switch (not shown) flash.

HAP ALL



1 > GIVES A STEADY SINGLE TONE

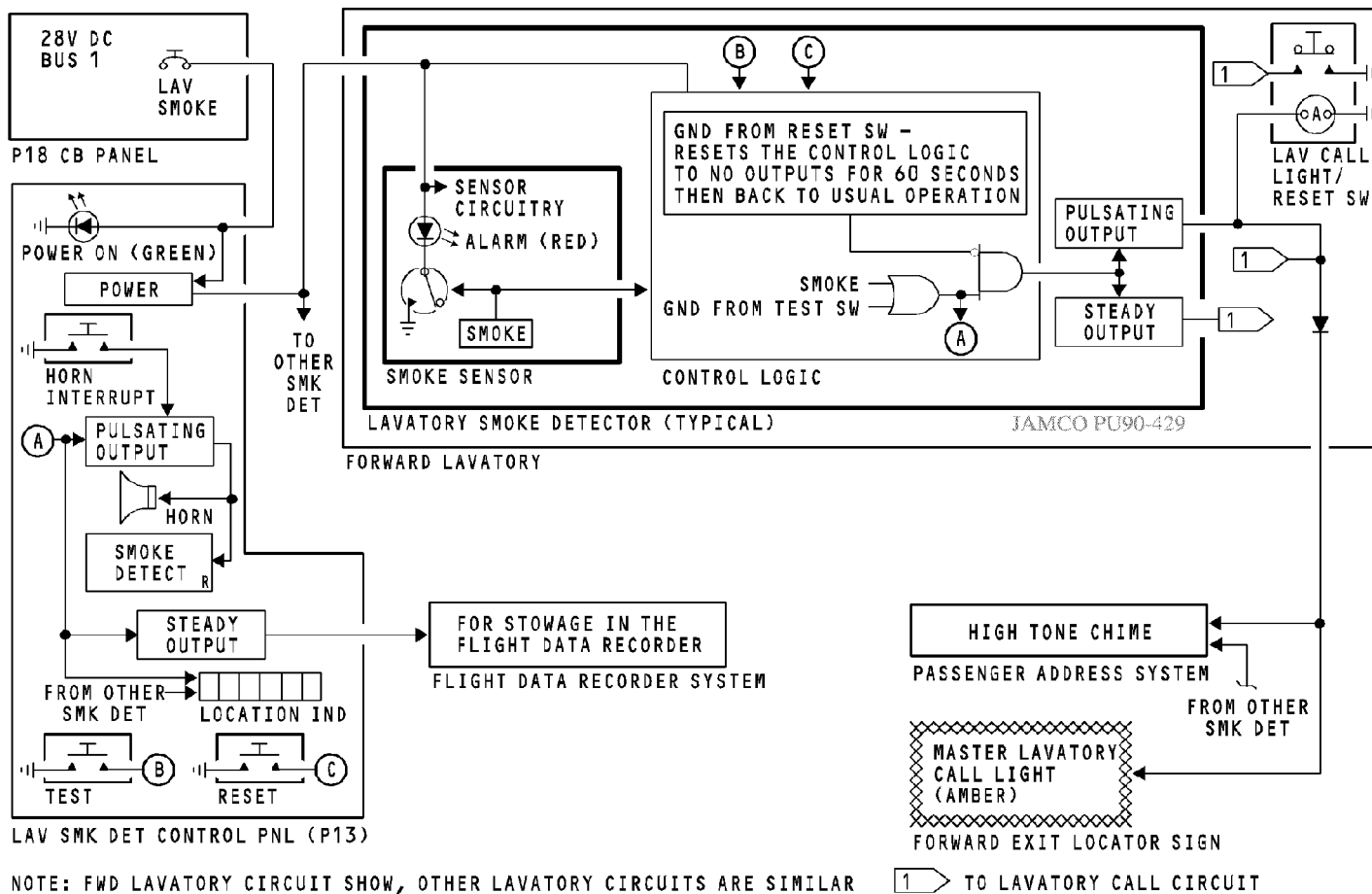
FIRE PROTECTION - LAVATORY SMOKE DETECTION - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - LAVATORY SMOKE DETECTION - FUNCTIONAL DESCRIPTION

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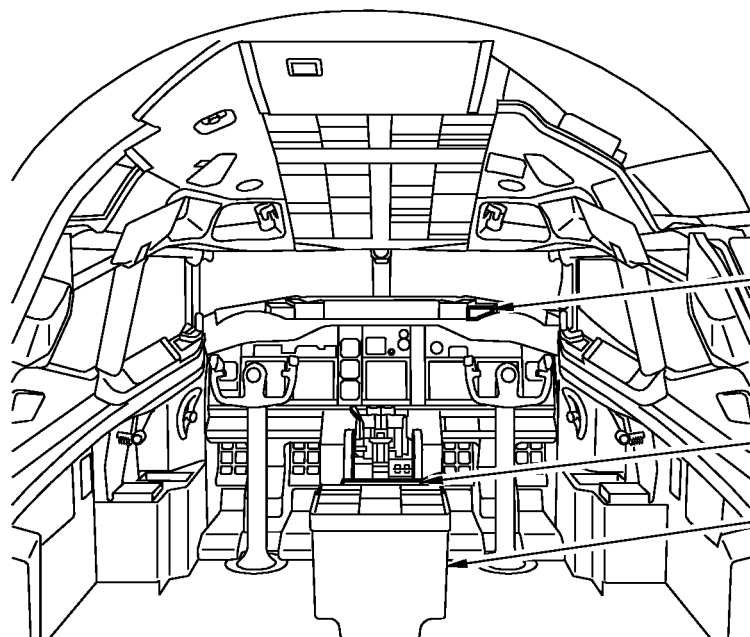
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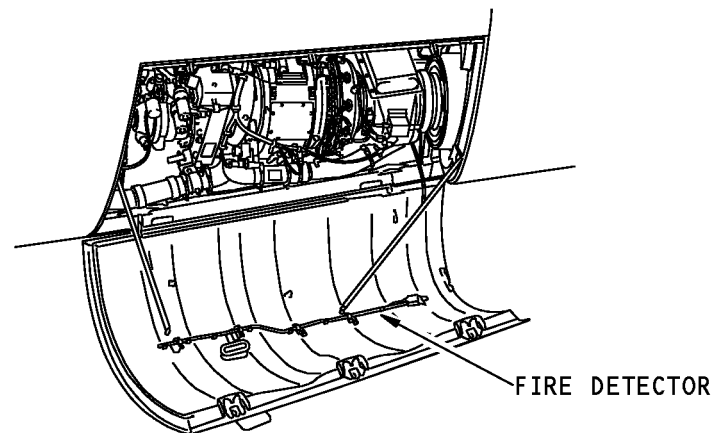
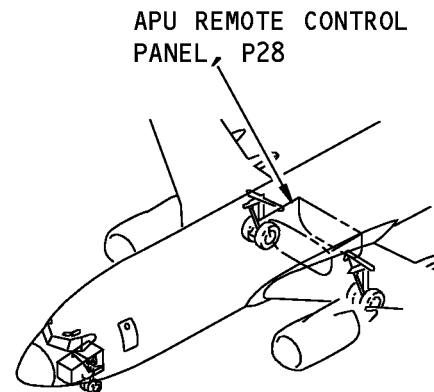
FIRE PROTECTION - APU FIRE DETECTION - INTRODUCTION

Purpose

The APU fire detection system uses detectors on the APU. The detectors monitor the APU for a fire condition. When the system senses a fire condition, alarm indications operate in the flight compartment. The indications are on the glareshield P7 panel and on the engine and APU fire control panel on the P8. A bell also operates in the flight compartment. A horn and a red light operate in the right main wheel well.



FLIGHT COMPARTMENT



AUXILIARY POWER UNIT (APU)

FIRE PROTECTION - APU FIRE DETECTION - INTRODUCTION

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FIRE PROTECTION - APU FIRE DETECTION - GENERAL DESCRIPTION

General Description

These are the components of the APU fire detection system:

- APU fire detectors
- Engine and APU fire detection module
- Glareshield, P7 panel
- Engine and APU fire control panel
- APU remote control panel, P28.
- Aural warning unit
- APU electronic control unit.

Fire detectors on the APU send signals to the engine and APU fire detection module. This module will supply aural and visual indications in the flight compartment. Also, the module sends signals to the APU control unit to automatically shutdown the APU.

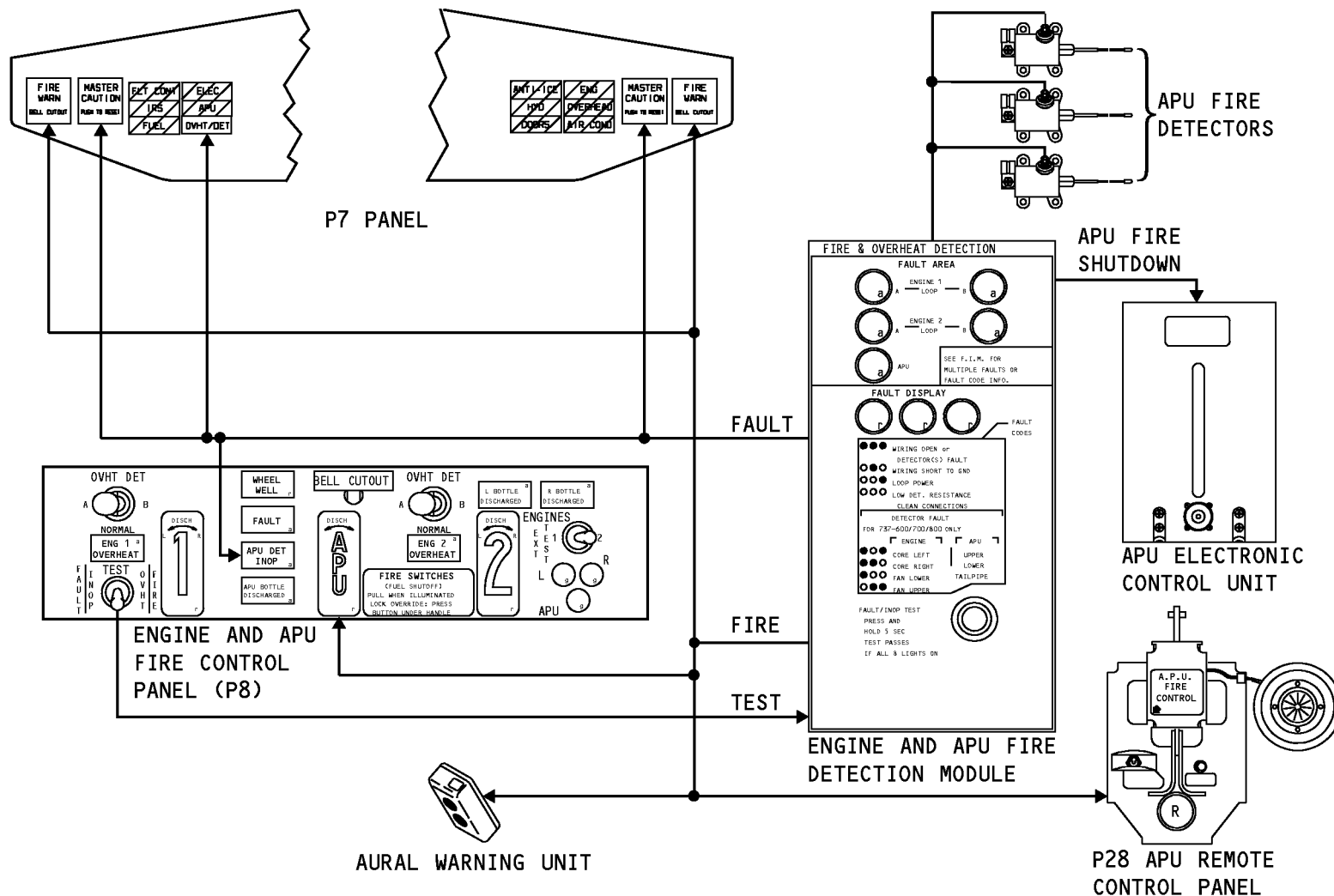
The APU remote control panel gives the external indications of an APU fire. A horn and red light operate alternately at a one per second rate.

Overheat/Fire Test

You use the TEST switch on the engine and APU remote control panel. In the OVHT/FIRE position, the indications in the flight compartment and on the APU remote control panel are the same as for a real fire condition. If the test fails, use the engine and APU fire detection module to isolate the fault.

Fault/Inop Test

You use the TEST switch on the engine and APU fire control panel. In the FAULT/INOP position, the indications in the flight compartment are the same as a real fault condition. If the test fails, use the engine and APU fire detection module to isolate the fault.



FIRE PROTECTION - APU FIRE DETECTION - GENERAL DESCRIPTION

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FIRE PROTECTION - APU FIRE DETECTION - APU FIRE DETECTOR

Purpose

The APU fire detectors monitor for high temperatures in the APU compartment.

General Description

The APU has three detectors. The detectors monitor three sections of the APU. In each section, one detector attaches to a support tube with clamps. There is one loop for the APU fire detection.

Physical Description

Each detector has these parts:

- Fire and fault pressure switches
- Resistors
- Terminal stud
- Stainless steel, gas charged tube.

Location

These are the locations of the APU fire detectors:

- Upper APU compartment
- APU compartment door
- Tailpipe.

Detector Characteristics

Detector Location	Fire
Upper APU Compt	450F (232C)
Lower APU Compt	450F (232C)
Tailpipe	275F (135C)

Operation

The two pressure switches sense for these conditions:

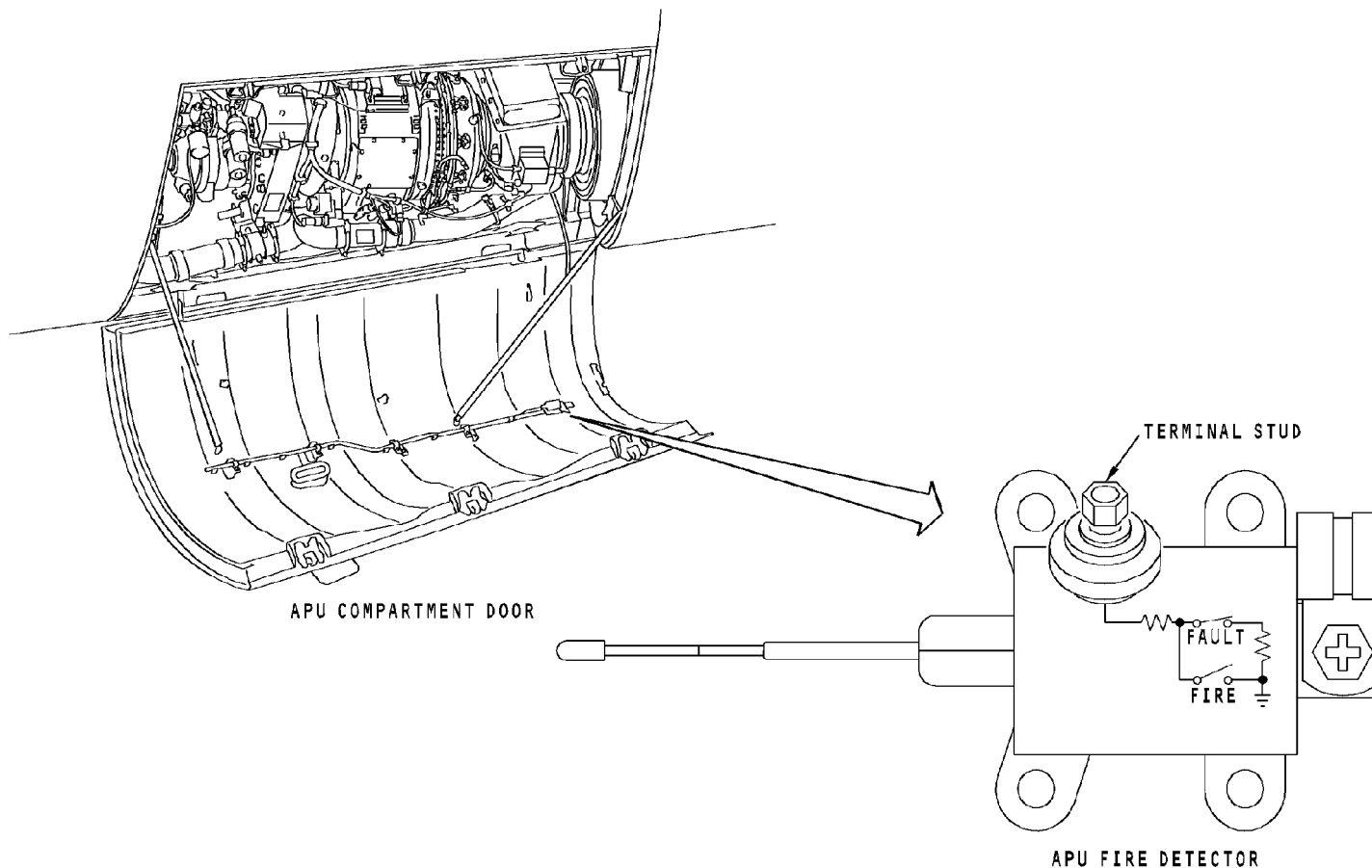
- Fire
- Fault (loss of gas pressure).

Gas pressure in the sense tube holds the fault pressure switch in the closed position. The other pressure switch closes when the gas pressure increases because of a fire condition.

The fire signals go to the engine and APU fire detection module. This module supplies the fire indication in the flight compartment.

See the engine fire detection section for more information on the engine and APU fire detection module. (SECTION 26-11)

If the pressure in the sense tube decreases, the fault switch opens. This switch sends the fault signal to the engine and APU fire detection module.



FIRE PROTECTION - APU FIRE DETECTION - APU FIRE DETECTOR

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FIRE PROTECTION - APU FIRE DETECTION - FUNCTIONAL DESCRIPTION

Functional Description

At the fire temperature set point, the gas expands in the detector and closes the FIRE pressure switch. This decreases the resistance of the detector.

The engine APU control module uses this change in resistance to set the fire condition. These are the results of a fire condition:

- APU fire handle light comes on
- APU fire handle switch unlocks
- Two red FIRE WARN lights come on
- Aural warning unit gives the bell sound
- APU automatic shutdown
- APU remote horn and light come on.

NOTE: You can also do the FAULT INOP test at the engine and APU fire detection module. The indications in the flight compartment will be the same.

The FAULT/INOP test does a check of the module fault detection circuitry and related flight compartment indications. These are the indications of a good FAULT/INOP test:

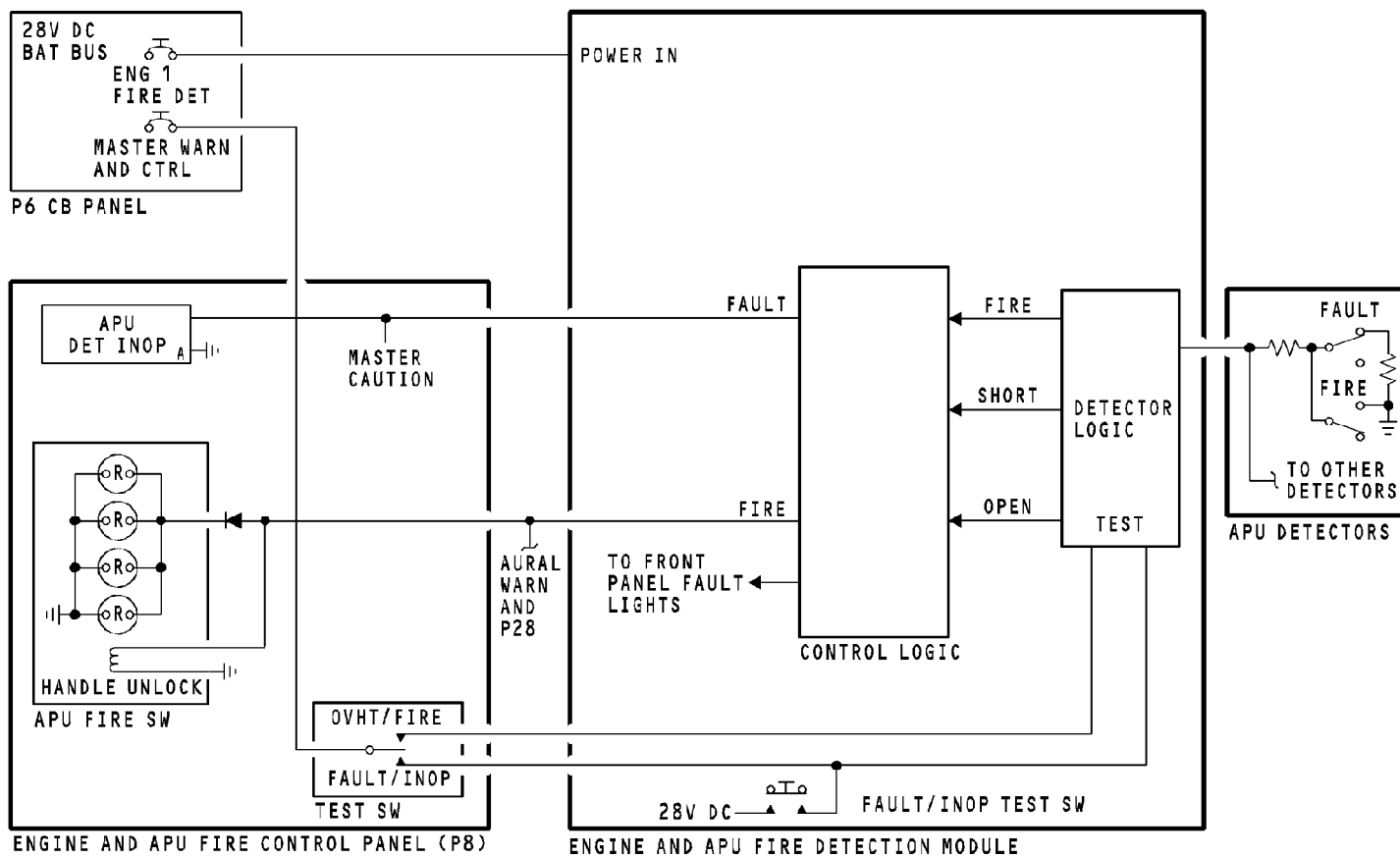
- MASTER CAUTION and OVHT/DET annunciator lights come on
- Amber FAULT light comes on
- Amber APU DET INOP light comes on
- All FAULT AREA lights on the engine and APU fire detection module come on
- FAULT DISPLAY lights the engine and APU fire detection module come on after five seconds.

The OVHT/FIRE test simulates a fire condition. These are the indications of a good OVHT/FIRE test:

- MASTER CAUTION and OVHT/DET annunciator lights come on
- Two red FIRE WARN lights come on
- ENG 1, ENG 2, and APU fire handle switch lights come on
- Amber ENG 1 and ENG 2 OVERHEAT lights come on
- Red WHEEL WELL light comes on (115v ac power is necessary)
- Aural warning unit supplies the bell sound
- APU remote control panel horn and red light come on
- ENG 1, ENG 2, and APU fire handle switches unlock.

Training Information Point

NOTE: The MASTER CAUTION indication does come on with the APU DET INOP light.



FIRE PROTECTION - APU FIRE DETECTION - FUNCTIONAL DESCRIPTION

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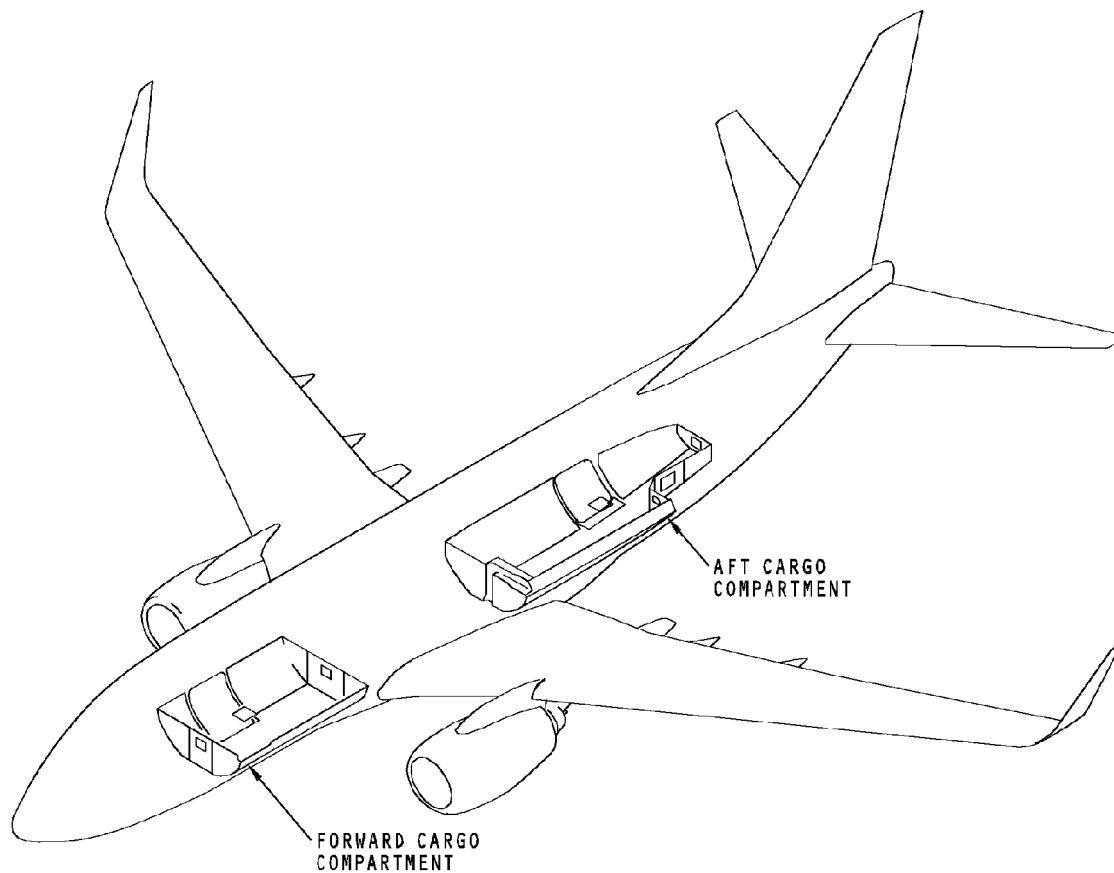
FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - INTRODUCTION

Purpose

The lower cargo compartment smoke detection system gives warnings in the flight deck if there is smoke in a lower cargo compartment. There are warnings for the forward and the aft lower cargo compartments.

Abbreviations and Acronyms

- CEU - cargo electronic unit



FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - INTRODUCTION

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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - GENERAL DESCRIPTION**General Description**

These are the components of the lower cargo compartment smoke detection system:

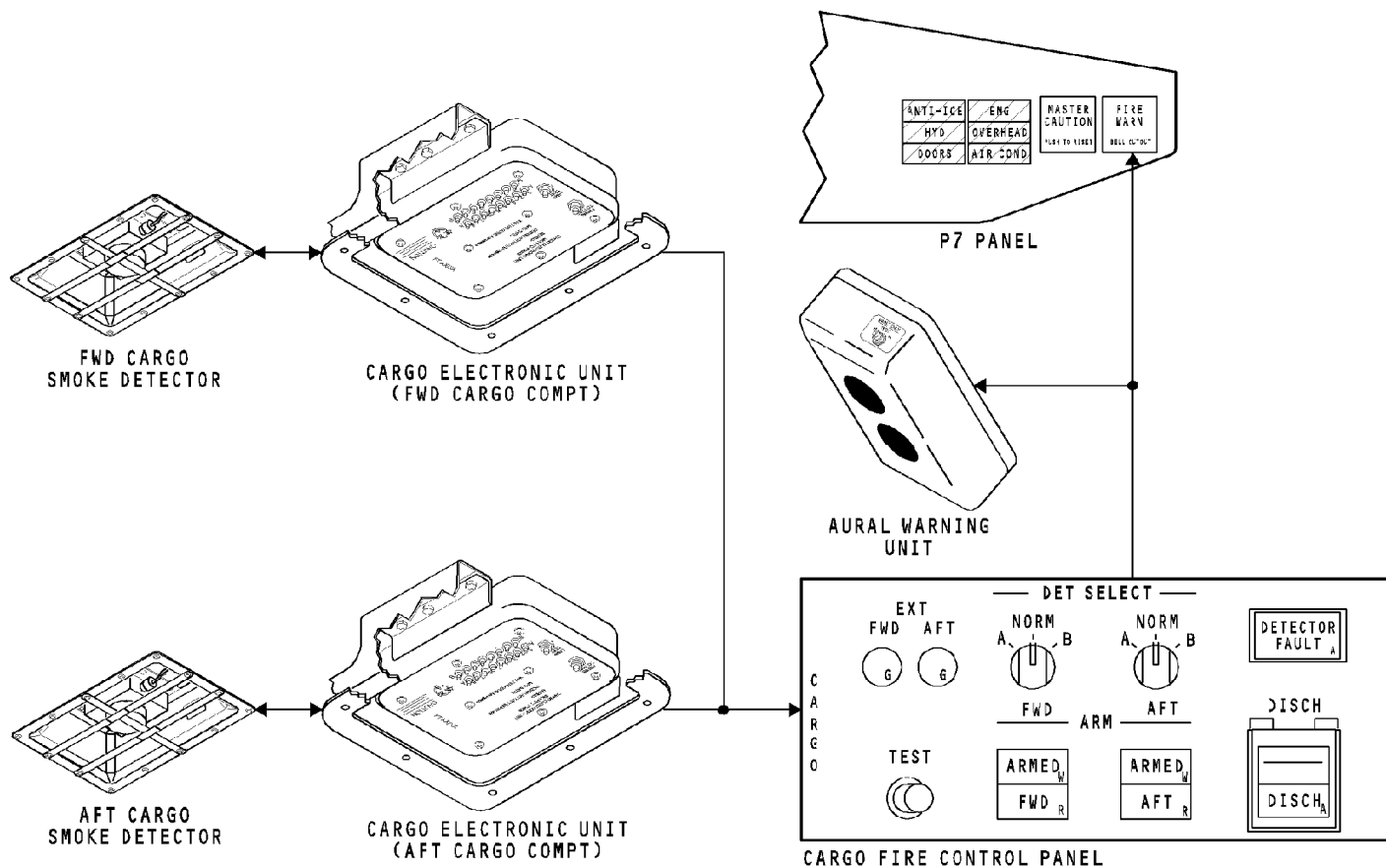
- Smoke detectors
- Cargo electronic units
- Cargo fire control panel
- Aural warning unit
- Fire warning lights.

The smoke detectors are in a dual loop configuration.

Each smoke detector monitors the cargo compartment for smoke and heat. If the detector senses smoke or heat, a signal goes to the cargo electronic unit. The cargo electronic unit sends a signal to the flight compartment for indications.

These are the indications in the flight compartment:

- FWD or AFT cargo fire light on the cargo fire control panel comes on
- P7 FIRE WARN lights come on
- Bell sound from the aural warning unit.



FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - GENERAL DESCRIPTION

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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - COMPONENT LOCATION

Component Location

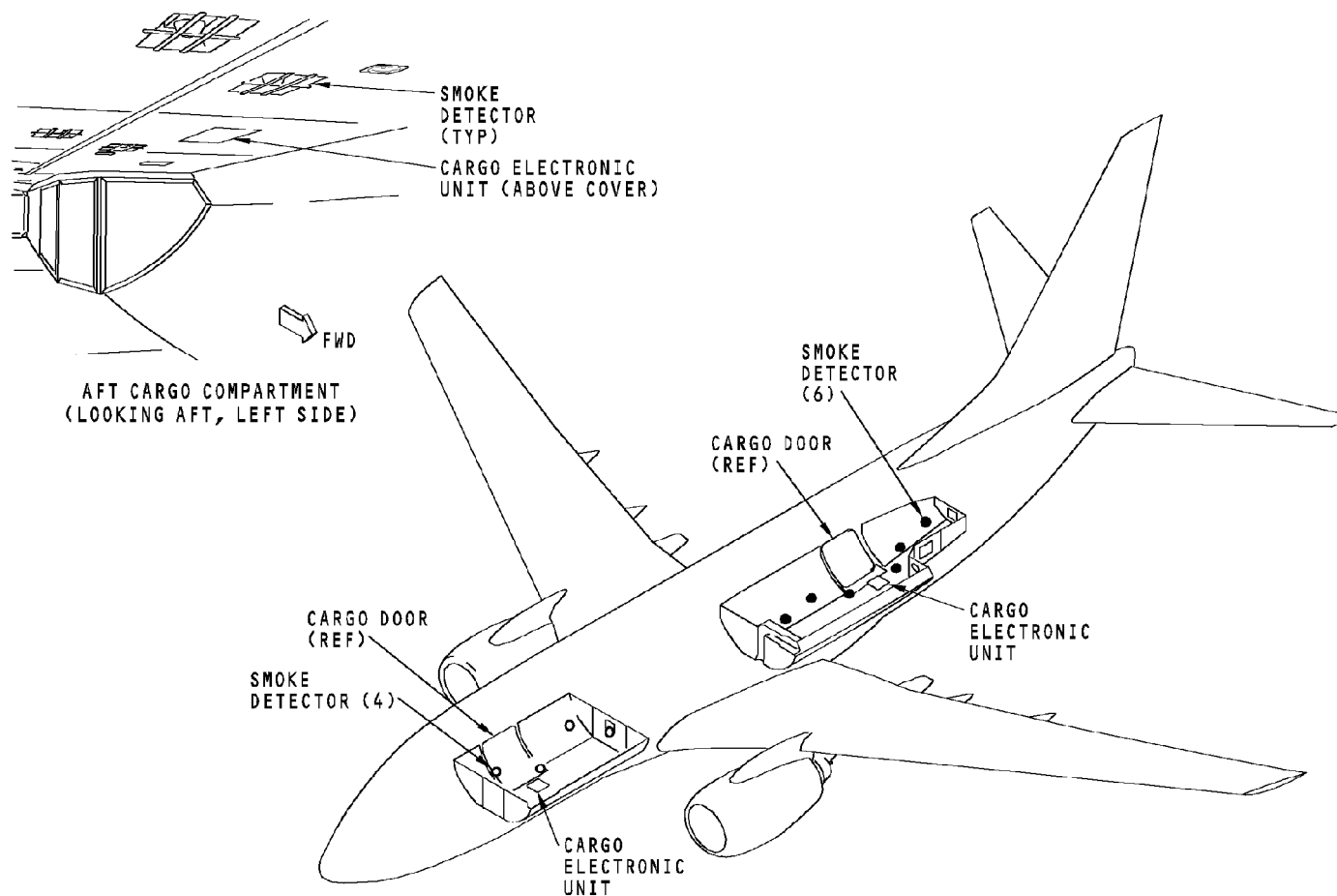
The lower cargo compartments have many cargo smoke detectors and one cargo electronic unit in each compartment.

The forward lower cargo compartment has four smoke detectors. The aft lower cargo compartment has six smoke detectors. The detectors are in the ceiling of the compartments.

You remove a protective guard to get access to a smoke detector.

One cargo electronic unit is in the ceiling on the left side of each cargo compartment, inboard of the cargo door.

You remove a cover to get access to a cargo electronic unit.



FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - COMPONENT LOCATION

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FIRE PROTECTION - LWR CARGO COMPARTMENT SMOKE DETECTION - SMOKE DETECTOR**Purpose**

The smoke detectors monitor air in the forward and aft lower cargo compartments for smoke and heat.

Location

The smoke detectors are in pans in the ceiling of the forward lower cargo compartment and in the aft lower cargo compartment.

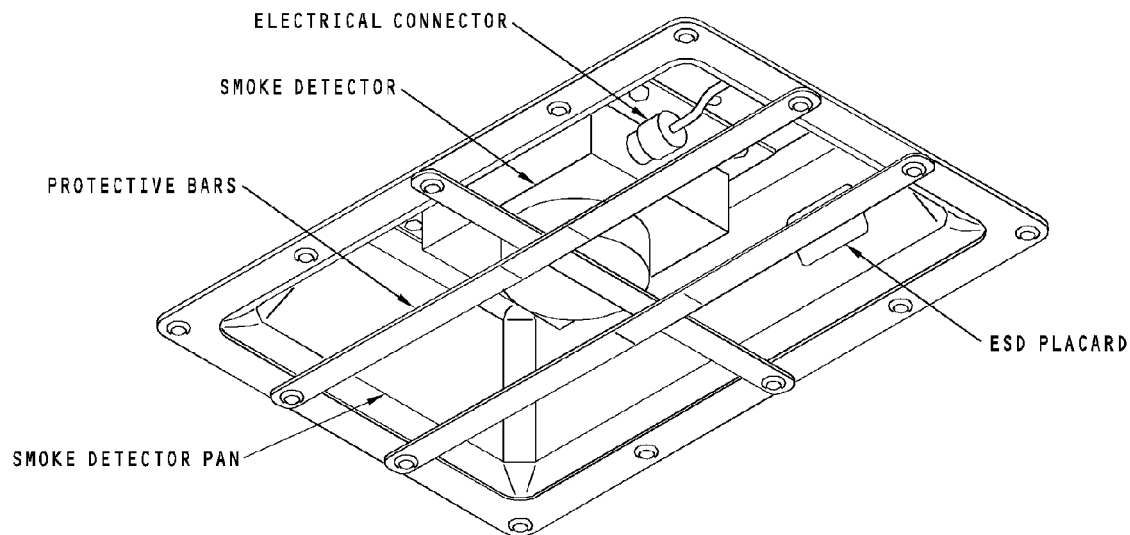
Physical Description

The forward and aft smoke detectors are the same. The smoke detectors have these components:

- Electrical connector
- Smoke detection chamber (internal)
- Electronic circuit (internal).

Functional Description

The smoke detectors use photoelectric cells to detect smoke. The smoke detector gives an alarm signal if it senses smoke or if it senses air temperature more than 230F (110C).



FIRE PROTECTION - LWR CARGO COMPARTMENT SMOKE DETECTION - SMOKE DETECTOR

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FIRE PROTECTION - LWR CARGO COMPARTMENT SMOKE DETECTION - CARGO ELECTRONIC UNIT

Purpose

The cargo electronic units monitor the forward and aft lower cargo compartment smoke detectors.

Training Information Point

The cargo electronic unit is an LRU. There is no scheduled maintenance of the cargo electronic units.

Physical Description

The forward and aft cargo electronic units are identical. The cargo electronic units have these items:

- Two electrical connectors (at back of unit)
- 16 red light emitting diodes (LEDs)
- Lamp test switch
- System test switch
- Electronic circuits (internal)

General Description

There are four smoke detectors (two in loop A and two in loop B) in the forward cargo compartment. Red LED lights on the front of the CEU labeled 1A, 1B, 2A and 2B connect to smoke detectors. The remaining LED lights are active and connect externally by a jumper cable loop.

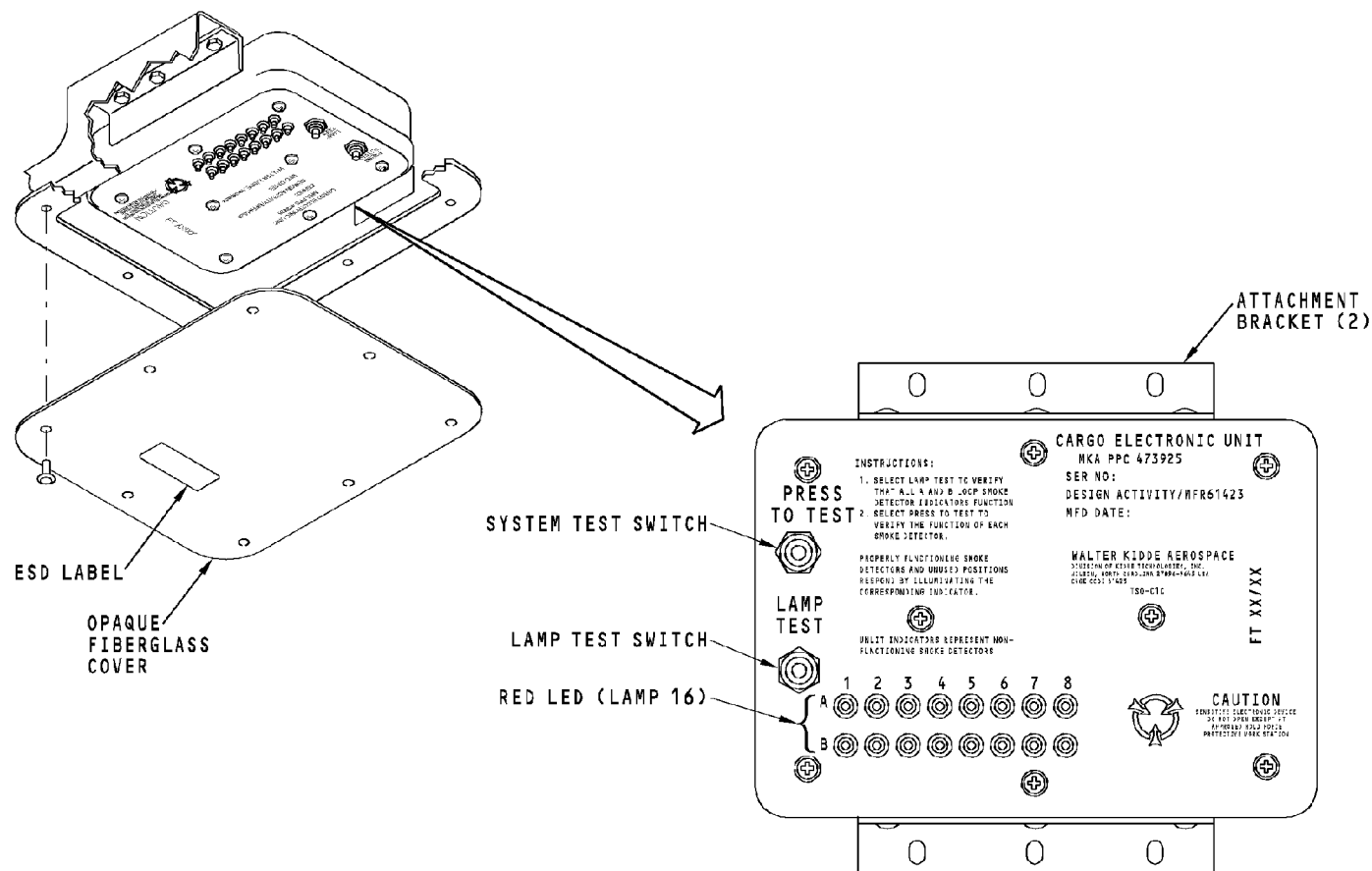
There are six smoke detectors (three in loop A and three in loop B) in the aft cargo compartment. Red LED lights on the front of the CEU labeled 1A, 1B, 2A, 2B, 3A and 3B connect to smoke detectors. The remaining LED lights are active and connect externally by a jumper cable loop.

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FIRE PROTECTION - LWR CARGO COMPARTMENT SMOKE DETECTION - CARGO ELECTRONIC UNIT

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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - CARGO FIRE CONTROL PANEL

Purpose

The cargo fire control panel monitors the fire protection system for these conditions:

- Lower cargo compartment smoke
- Lower cargo compartment overheat
- Smoke detector fault conditions
- Cargo fire extinguisher bottle squib condition
- Cargo fire extinguisher bottle discharge.

The cargo fire control panel lets you do these functions:

- Set the mode of operation (single or dual loop smoke detector operation)
- Operate a cargo fire extinguisher bottle
- Do a test of the cargo fire extinguisher bottle squibs
- Do a test of the lower cargo fire protection system
- Do a test of the fault detection circuits.

Physical Description

These are the cargo fire control panel components:

- Amber DETECTOR FAULT light
- DET SELECT switches
- Green FWD and AFT EXT lights
- Amber DISCH switchlight (guarded)
- FWD and AFT cargo fire arm switches
- TEST push-button switch.

General Description

The DETECTOR FAULT amber light comes on if a cargo smoke detector has a fault.

Each DET SELECT switch has these three positions:

- NORM - both detector loops are necessary to sense a smoke or overheat condition to give a fire indication
- A - only the A loop is necessary to sense a smoke or overheat condition for a fire indication
- B - only the B loop is necessary to sense a smoke or overheat condition for a fire indication.

The green FWD and AFT EXT lights show extinguisher bottle squib continuity.

The DISCH switchlight comes on when the bottle pressure is less than 250 psi.

The TEST push button does a check of the cargo smoke detectors and the extinguishing system.

The FWD or AFT red cargo fire lights come on if a fire indication is given by the smoke detectors.

The ARMED light on the fire arm switches comes on when you push the related switch. When the fire armed switch is not pushed you can not see the word ARMED.



FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - CARGO FIRE CONTROL PANEL

The P7 FIRE WARN lights come on and the aural warning unit operates if there is a cargo compartment smoke or overheat condition.

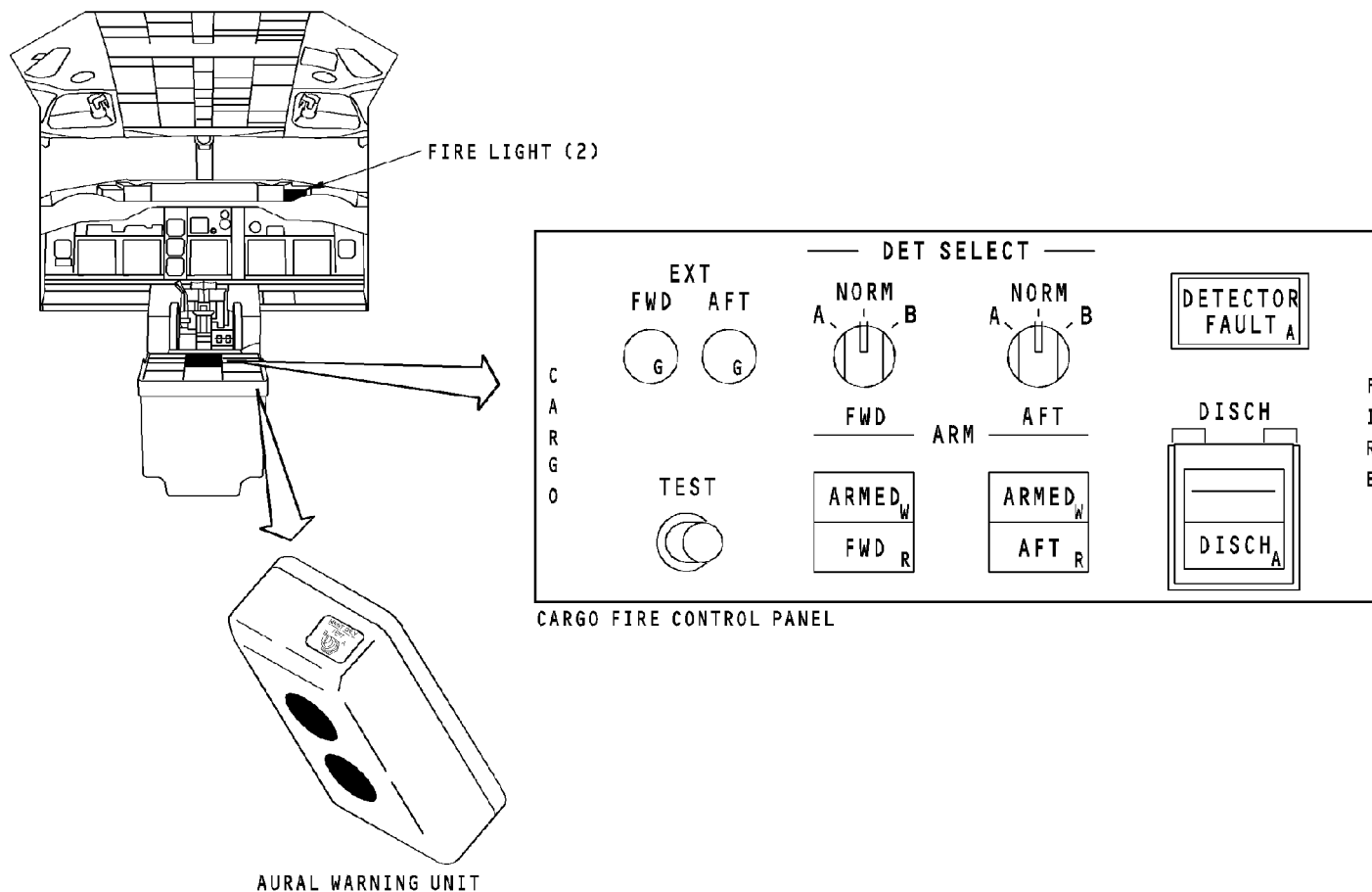
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HAP ALL

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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - CARGO FIRE CONTROL PANEL

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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - FUNCTIONAL DESCRIPTION - LOWER DECK

Smoke Detection

The smoke detectors in the lower cargo compartments are monitored by the cargo electronic units (CEUs). These units process inputs from smoke detectors and interface with the components in the flight compartment.

If smoke is detected in the lower cargo compartment, the detector sends an alarm signal to the CEU. The CEU sends the alarm signal to the cargo fire control panel.

The cargo fire control panel turns on the FWD or AFT red fire lights and sends an alarm signal to these components:

HAP 028-054, 101-999; HAP 001-013, 015-026 POST SB 737-21-1135

- Cabin pressure control system

HAP ALL

- P7 FIRE WARN lights come on
- Aural warning unit gives the bell sound.

HAP 028-054, 101-999; HAP 001-013, 015-026 POST SB 737-21-1135

The cargo fire control panel sends the alarm signal to the cabin pressure control system. This signal causes the CPC to set the cabin pressure rate of descent to 750 slfpm. This helps prevent smoke penetration into the passenger cabin from the lower lobe. This function is inhibited on the ground.

HAP ALL

Functional Description

There are four smoke detectors (two in loop A and two in loop B) in the forward cargo compartment. Red LED lights on the front of the CEU labeled 1A, 1B, 2A and 2B connect to smoke detectors. The remaining LED lights are active and connect externally by a jumper cable loop.

There are six smoke detectors (three in loop A and three in loop B) in the aft cargo compartment. Red LED lights on the front of the CEU labeled 1A, 1B, 2A, 2B, 3A and 3B connect to smoke detectors. The remaining LED lights are active and connect externally by a jumper cable loop.

Fault Detection

If a detector does not operate, the CEU sends the fault signal to the cargo fire control panel.

The DETECTOR FAULT amber light comes on for a fault indication.

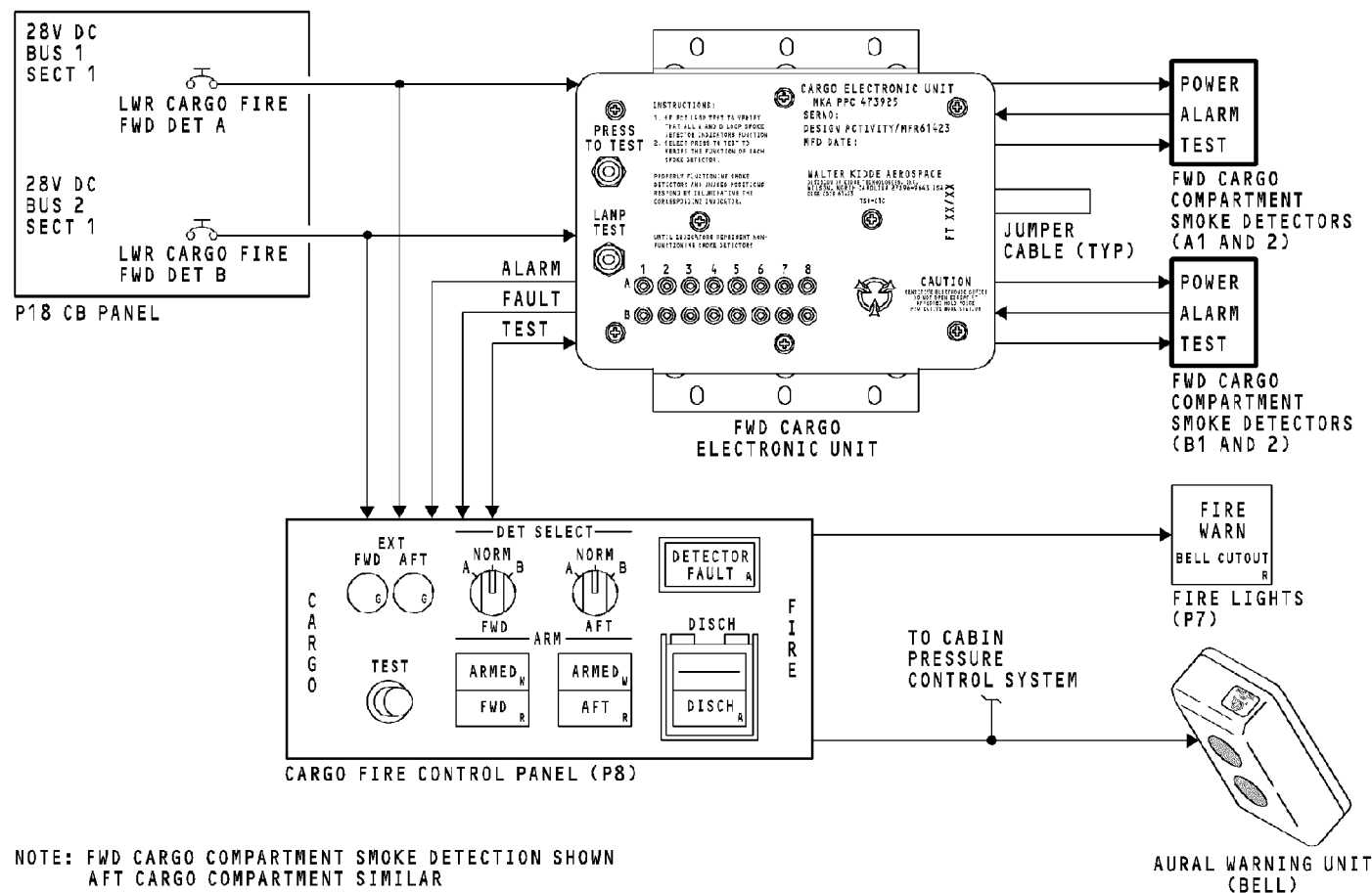
BITE

You can test the smoke detection system with the cargo fire control panel or the cargo electronic units.



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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - FUNCTIONAL DESCRIPTION - LOWER DECK

EFFECTIVITY

HAP 028-054, 101-999; HAP 001-013, 015-026 POST SB 737-21-1135

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FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - SMOKE DETECTOR TEST

General

The cargo smoke detection system uses these components:

- Cargo fire control panel
- Two cargo electronic units (CEUs)
- Smoke detectors.

Cargo Electronic Unit Test

These are the indications if you push the LAMP TEST or PRESS TO TEST buttons:

- LAMP TEST, all 16 red lights come on
- PRESS TO TEST, all 16 red lights come on.

At the same time, these show on the cargo fire control panel:

- The EXT FWD and EXT AFT green lights come on
- FWD and AFT red switchlights come on
- DISCH amber light comes on.

If there is a fault, one or more of the red lights do not come on.

Cargo Fire Control Panel Test

These are the indications when you push the TEST button on the cargo fire control panel:

- EXT FWD and EXT AFT green lights come on
- FWD and AFT red switchlights come on
- DISCH amber light come son
- P7 FIRE WARN lights come on

- Aural warning unit gives the bell sound.

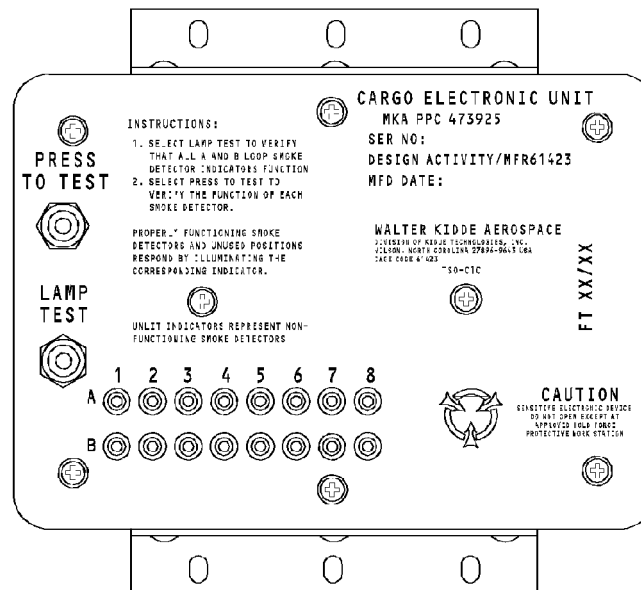
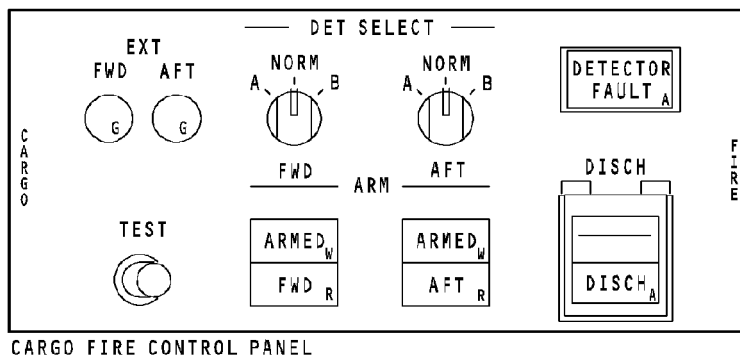
At the same time, the 16 red lights on the CEU come on.

If there is a fault, the DETECTOR FAULT light comes on.

Training Information Point

This table shows when the DETECTOR FAULT light comes on automatically.

STATUS	DET SELECT SWITCH	DETECTOR FAULT LIGHT
Loop A and B fail	NORMAL	ON
Loop A fail	A	ON
Loop B fail	B	ON



FIRE PROTECTION - CARGO COMPARTMENT SMOKE DETECTION - SMOKE DETECTOR TEST

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - INTRODUCTION

Purpose

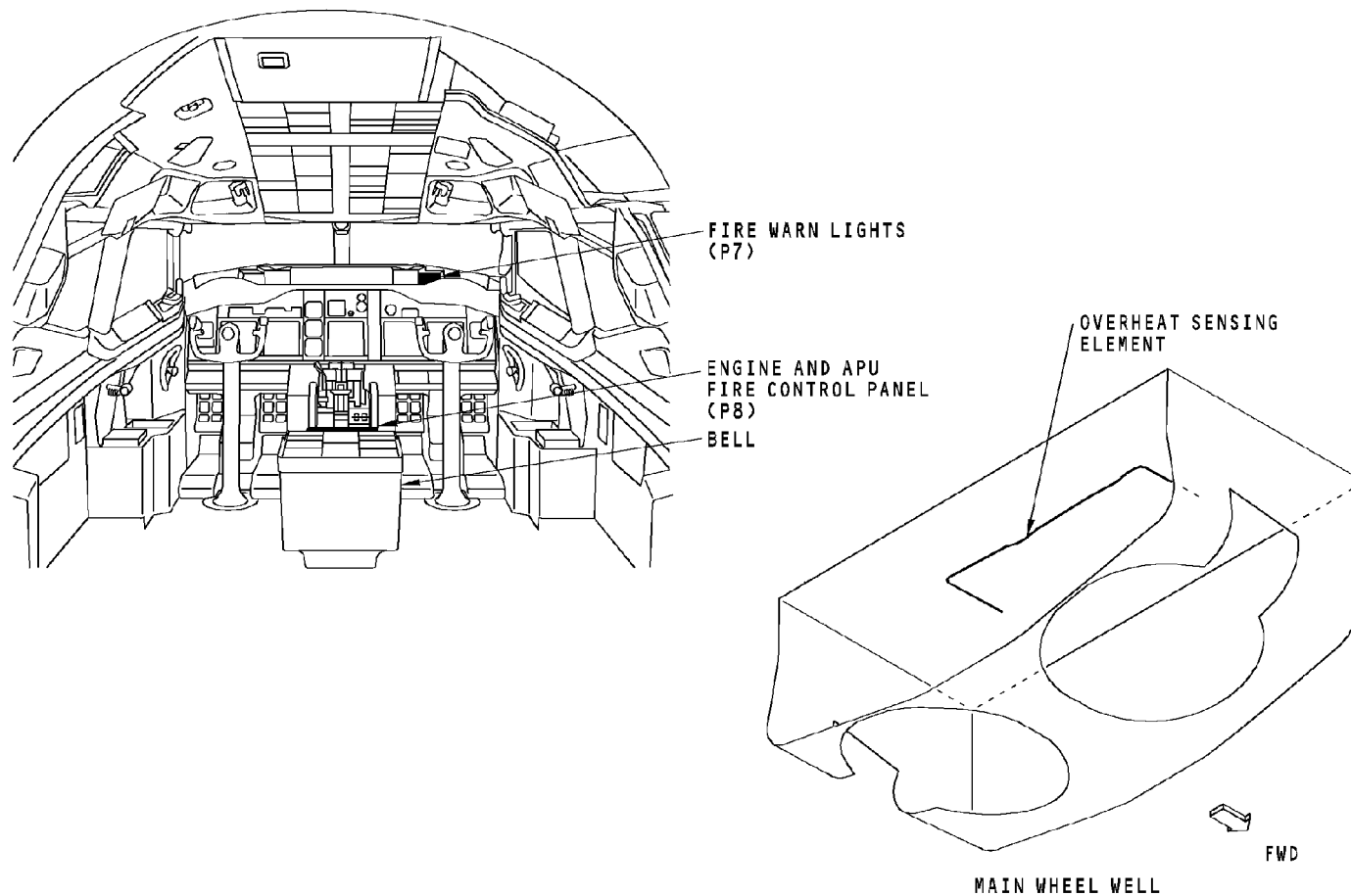
The wheel well fire detection system uses overheat sensing elements in the main wheel well. It monitors the wheel well for fire condition. When the system senses a fire condition, alarm indications operate in the flight compartment. The indications are on the glareshield panel P7 and on the engine and APU fire control panel P8. A bell also operates in the flight compartment.

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - INTRODUCTION

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - GENERAL DESCRIPTION

General Description

These are the components for the wheel well fire detection:

- Main wheel well fire (overheat) sensing element
- Compartment overheat detection controller
- P7 glareshield panel
- Engine and APU fire control panel
- Aural warning unit.

Fire (overheat) sensing element in the main wheel well supplies the wheel well fire detection signal. The signal goes to the compartment overheat detection controller. This unit supplies the fire alarms.

These are the flight compartment indications of a wheel well fire:

- Two red FIRE WARN lights on P7 panel come on
- Bell sounds in the aural warning unit
- Red WHEEL WELL light on engine and APU fire control panel comes on.

If the wheel well fire alarms come on due to a real fire or a fault, the MAINT ADV light on the compartment overheat detection controller comes on. Use the module to do a check for real alarm or a fault condition.

You use the test switch on engine and APU fire control module panel to the OVHT/FIRE position to do a test of the wheel well sensing element. If the test passes, the indications in the flight compartment are the same as for a real fire condition. If the test fails, use the compartment overheat detection controller to isolate the fault.

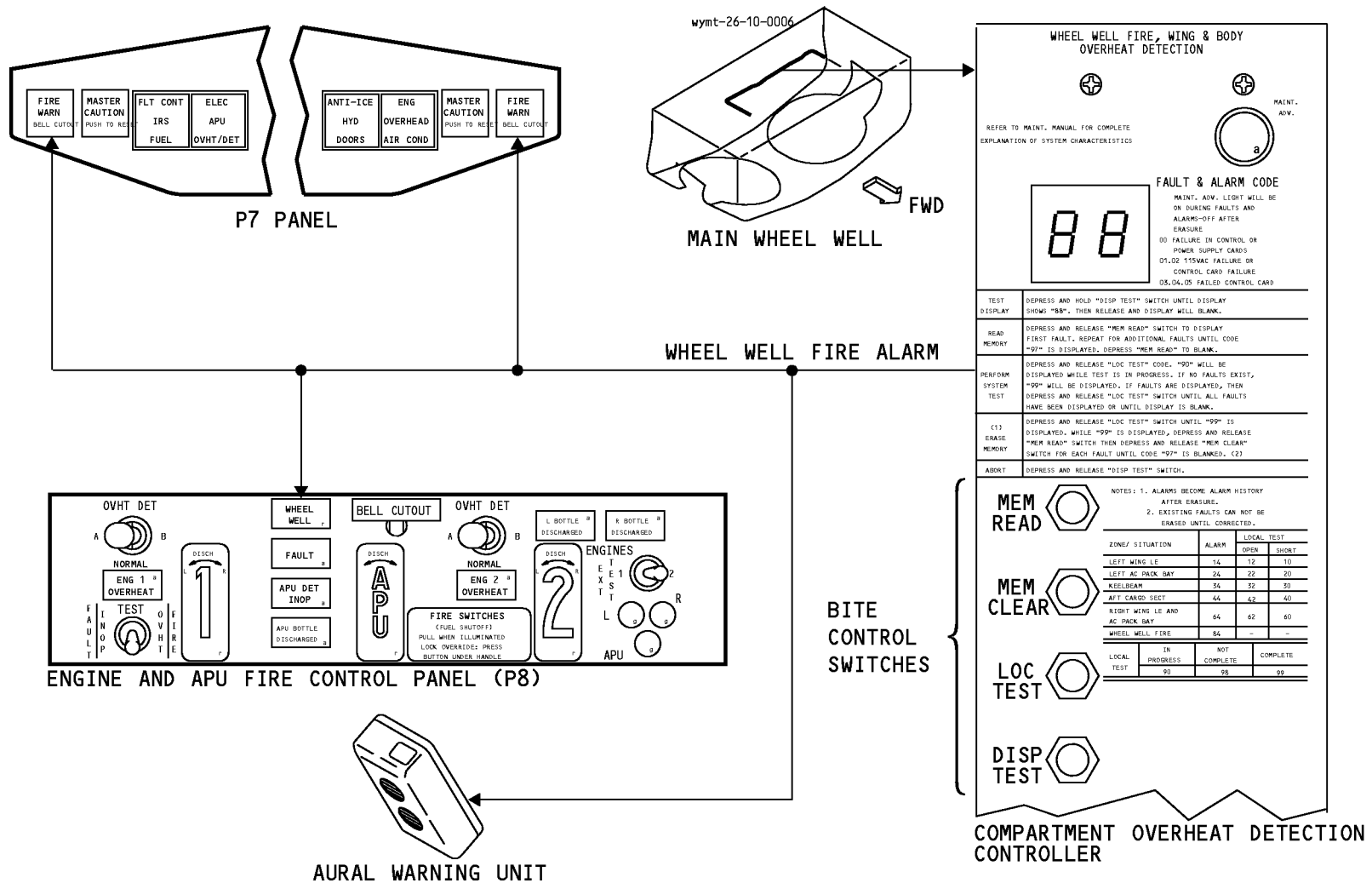
NOTE: During the wheel well fire test, the engine overheat, the engine fire, and the APU fire systems also do a test.

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - GENERAL DESCRIPTION

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - OVERHEAT DETECTOR ELEMENT

Purpose

The overheat sensing elements monitor for high temperature conditions in the main wheel well.

Physical Description

The sensing element has a single strand of nickel wire embedded in insulation. The insulation is impregnated with a salt compound and is in a tube. The sensing elements have these components:

- Nickel wire
- Insulation
- Tube
- Electrical connector.

Location

The sensing element is in the ceiling of the left and right main wheel wells.

The sensing element attaches to the ceiling of the wheel well by quick-release fasteners.

Functional Description

The sensing element is a thermistor type with resistance inversely proportional to temperature. As the element temperature increases, the resistance decreases. If any portion of the sensing element is above alarm temperature of 400F (205C), the element resistance decreases sharply. The single wire in the center of the core is the power lead and the outside tube is electrically grounded. The insulating resistance of the core material decreases suddenly at the alarm temperature. Current flows through the core material to ground when alarm temperature is sensed.

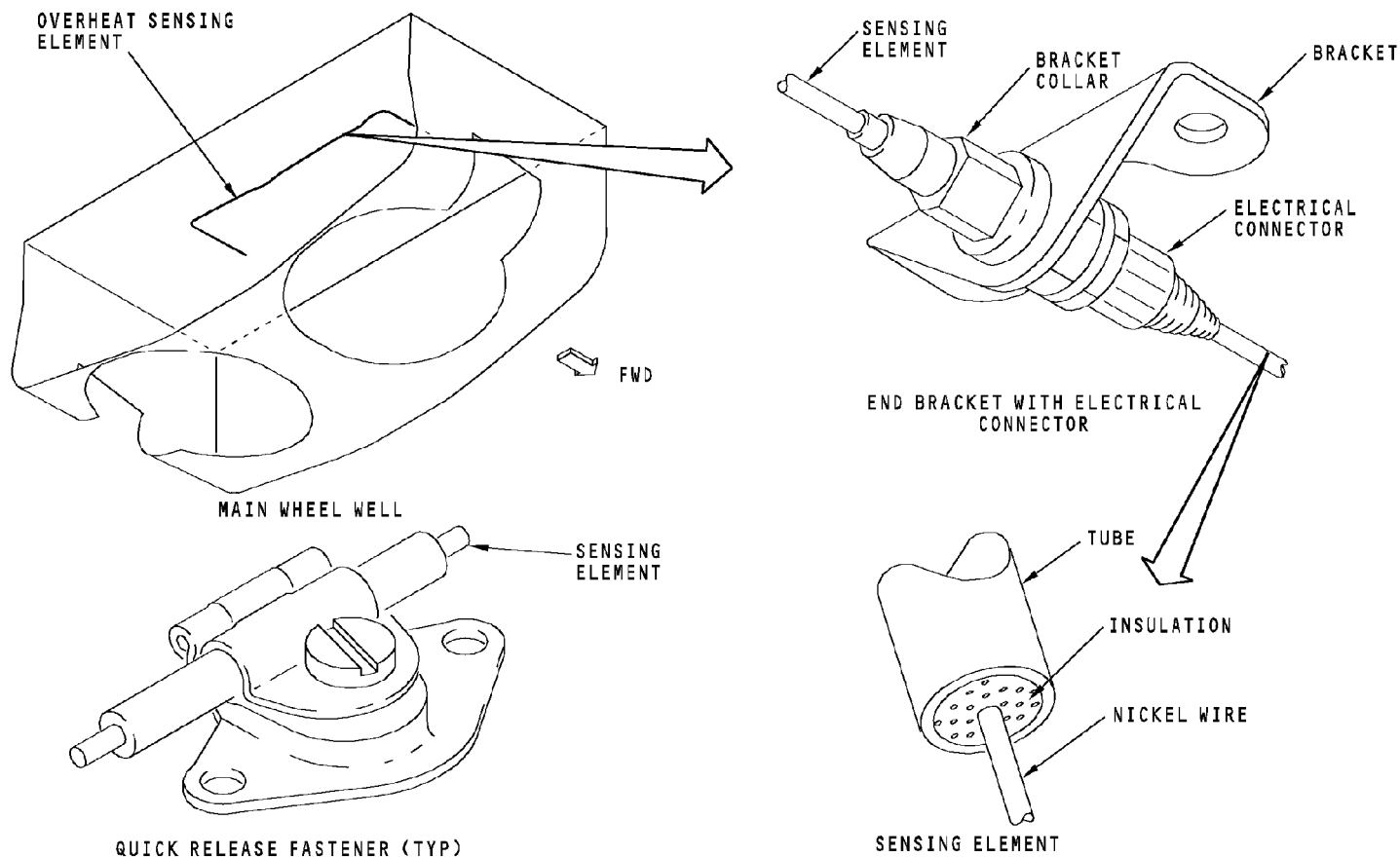
Training Information Point

The minimum bend radius for the sensing elements is one inch (2.5 cm). If possible, do not bend the element in a radius less than three inches (8 cm).

Sensing elements are in clamps with color-coded bushings. The element end brackets have collars that prevent the element from twisting when the electrical connectors are put on.

CAUTION: DO NOT MAKE THE PERMITTED DENTS OR KINKS STRAIGHT. DAMAGE TO THE TUBING CAN OCCUR.

NOTE: Make sure there is at least 0.50 inch (1.5 cm) between the element and the structure except at the mounting clips.



FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - OVERHEAT DETECTOR ELEMENT

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - COMPARTMENT OVERHEAT DETECTION CONTROLLER

Purpose

The compartment overheat detection controller monitors sensing elements for overheat and fire conditions in the wheel well and the wing and body areas.

Physical Description

The control circuits for the wing and body overheat detection are in the controller. The front panel has these components:

- MAINT ADV (maintenance advisory) light
- LED display
- BITE instructions
- Four BITE control switches (MEM READ, MEM CLEAR, LOC TEST and DISP TEST).

Location

The compartment overheat detection controller is in the electronic equipment compartment on the E1-4 rack.

BITE Test Switches and Indications

The non-volatile memory provides a storage area for ten fault/alarms. Failure of the control cards, power supply card, loss of ac or dc power are not stored. These failures are coded 00 to 05. Short circuit faults are stored as alarm codes.

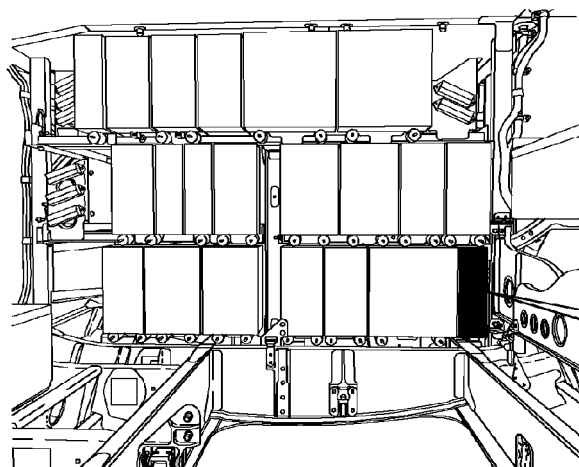
MEM READ (memory read switch), accesses the non-volatile memory.

MEM CLEAR (memory clear switch), clears the non-volatile memory. The existing faults and alarms can not be cleared until corrected.

LOC TEST (local test switch), initiates a test sequence of the control circuits and detector elements. This test will display codes 00 to 05, open loop codes and short loop codes.

DISP TEST (display test switch), verifies correct operation of the control circuits. This is indicated by code 88 being displayed.

MAINT ADV (maintenance advisory light), is on when a fault or an alarm is stored in the non-volatile memory. The light does not come on with codes 00 to 05.



FWD
E/E COMPARTMENT

LED
DISPLAY

BITE CONTROL
SWITCHES

WHEEL WELL FIRE, WING & BODY OVERHEAT DETECTION

REFER TO MAINT. MANUAL FOR COMPLETE EXPLANATION OF SYSTEM CHARACTERISTICS

MAINT. ADV. LIGHT

FAULT & ALARM CODE
MAINT. ADV. LIGHT WILL BE ON DUE TO FAULTS AND ALARMS WITH AFTER WARNING
00 FAILURE IN CONTROL OR POWER SUPPLY CIRCUIT
01-02 SYSTEM FAILURE OR CONFIG. ERROR FAILURE
03-04-05 FAILED CONTROL DATA

TEST
DISP. TEST: DEPRESS AND HOLD "DISP TEST" SWITCH UNTIL DISPLAY SHOWS "888". THEN RELEASE AND DISPLAY WILL BLINK.

READ MEMORY
DEPRESS AND RELEASE "MEM READ" SWITCH TO DISPLAY "TEST" FAULT. REPEAT FOR ADDITIONAL FAULTS UNTIL CODE "99" IS DISPLAYED. DEPRESS "MEM READ" TO BLANK.

PERFORM SYSTEM TEST
DEPRESS AND RELEASE "LOC TEST" CODE. "90" WILL BE DISPLAYED WHILE TEST IS IN PROGRESS. IF NO FAULTS EXIST, "99" WILL BE DISPLAYED. IF FAULTS ARE DISPLAYED, THEN DEPRESS AND RELEASE "LOC TEST" SWITCH UNTIL ALL FAULTS HAVE BEEN DISPLAYED OR UNTIL DISPLAY IS BLANK.

(1) ERASE MEMORY
DEPRESS AND RELEASE "LOC TEST" SWITCH UNTIL "99" IS DISPLAYED. WHILE "99" IS DISPLAYED, DEPRESS AND RELEASE "MEM READ" SWITCH THEN DEPRESS AND RELEASE "MEM CLEAR" SWITCH FOR EACH FAULT UNTIL CODE "99" IS SHOWN. (2)

ABORT
DEPRESS AND RELEASE "DISP TEST" SWITCH.

MEM READ

MEM CLEAR

LOC TEST

DISP TEST

NOTES: 1. ALARMS RECEIVE ALARM HISTORY AFTER ERASURE.
2. EXISTING FAULTS CAN NOT BE ERASED UNTIL CORRECTED.

ZONE/ SITUATION	ALARM	TEST	
		OPEN	SHOR
LEFT WING LE	14	12	10
LEFT AC PACK BAY	24	22	20
FEELERLY	34	32	30
APT CARGO EJECT	44	42	40
RIGHT WING LE AND AC PACK BAY	64	62	60
WHEEL WELL FIRE	84	-	-

LOCAL TEST	NOT COMPLETE	
	IN PROGRESS	COMPLETE
VC	VB	99

FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - COMPARTMENT OVERHEAT DETECTION CONTROLLER

EFFECTIVITY
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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - FUNCTIONAL DESCRIPTION

Functional Description

The compartment overheat detection controller supplies power to the sensing elements. The microprocessor monitors the wheel well sensing elements for alarm conditions.

If the microprocessor senses a wheel well fire, it keeps the alarm in memory and sets the fire condition. These are the indications of a wheel well fire:

- Two red FIRE WARN lights on P7 panel come on
- Aural warning unit gives the bell sound
- Red WHEEL WELL light on the engine and APU fire control panel comes on
- MAINT ADV light on the compartment overheat detection controller comes on.

Move the test switch to the OVHT/FIRE position to start a test of the wheel well fire detection system. The test alarm inputs are not kept in memory.

The test does a check of the continuity of the sensing element. If the sensing element has continuity, the indications are the same as during a real alarm. If the sensing element does not have continuity, there are no indications in the flight compartment.

There is no difference between a real alarm and a short circuit. If there is a short circuit, the indications are the same as for a real alarm.

Training Information Point

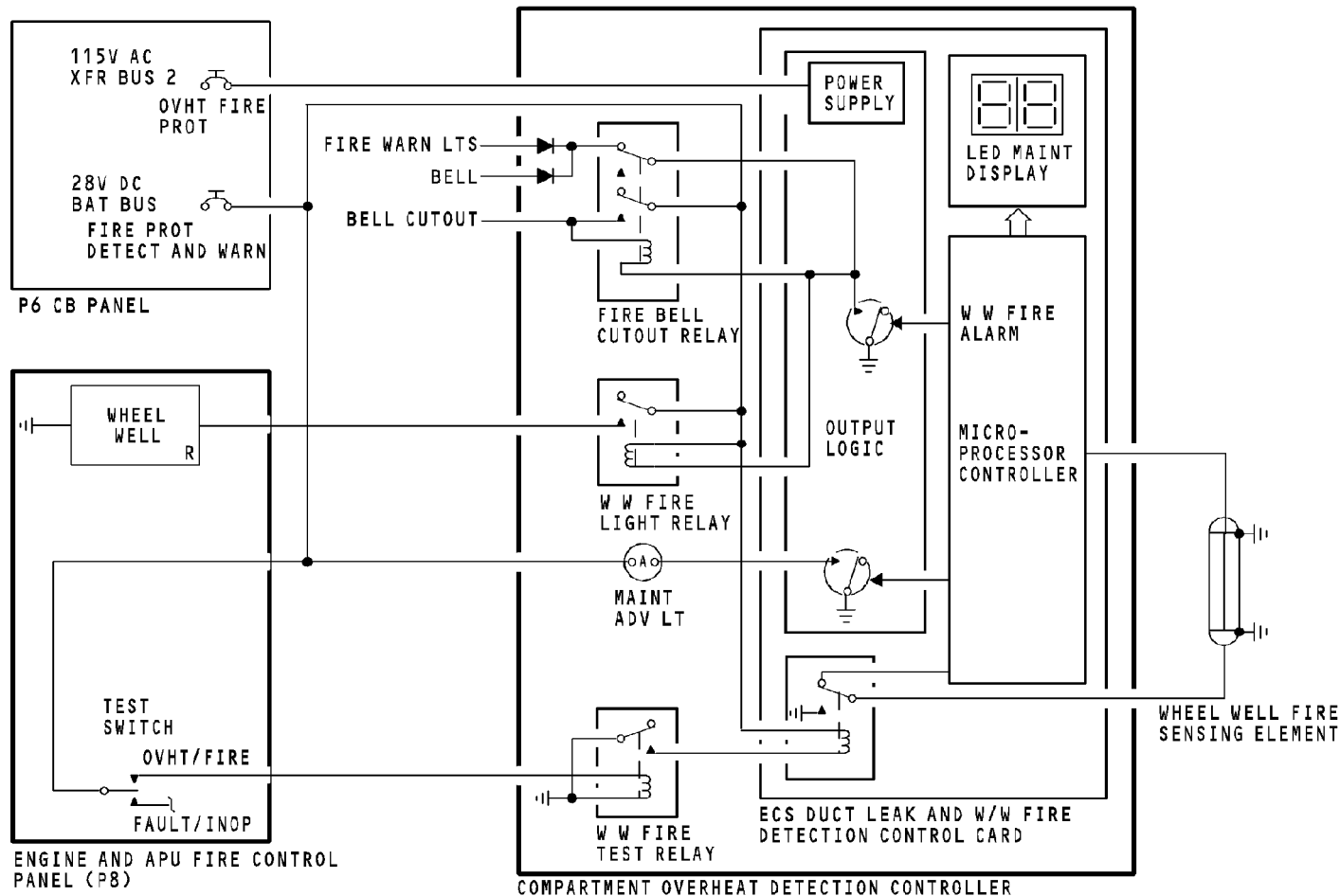
For the indications and test of the wheel well fire system, 115v ac power must be on.

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FIRE PROTECTION - WHEEL WELL OVERHEAT DETECTION - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - INTRODUCTION

Purpose

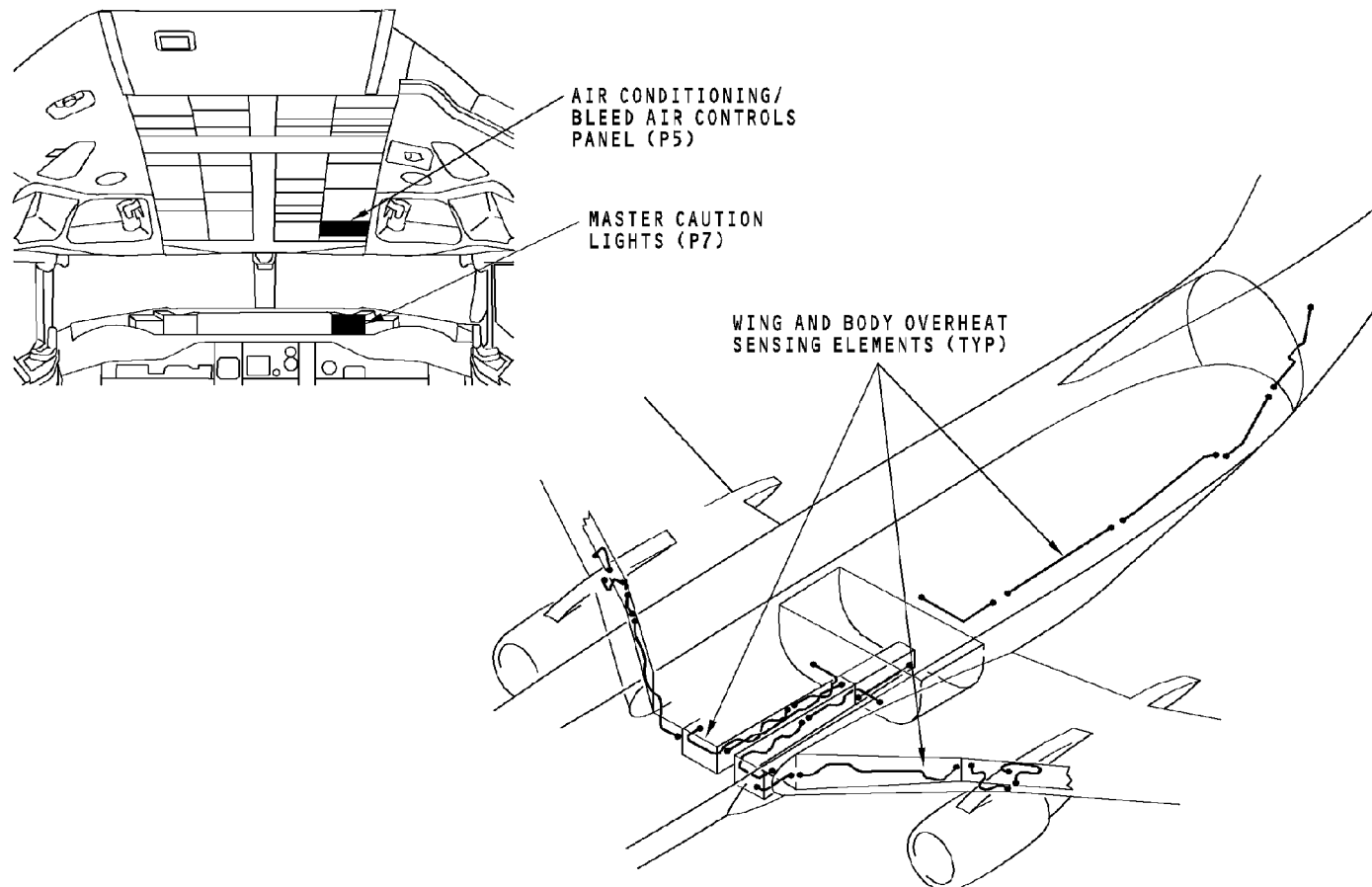
The wing and body overheat detection system uses sensing elements adjacent to the pneumatic ducts. It monitors the pneumatic distribution system ducts for overheat conditions. When the system detects an overheat condition, alarm indications turn on in the flight compartment. The indications are on the P7 glareshield panel and on the P5 air conditioning/bleed air controls panel.

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EFFECTIVITY
HAP ALL**26-18-00**

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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - INTRODUCTION

EFFECTIVITY
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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - GENERAL DESCRIPTION**General Description**

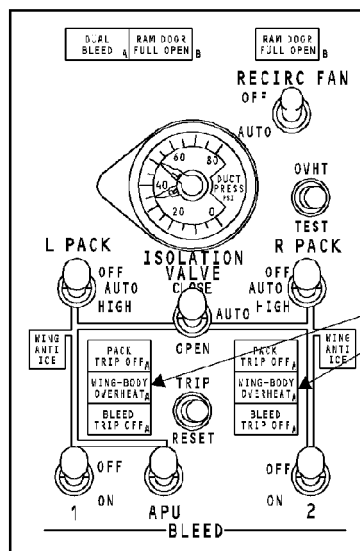
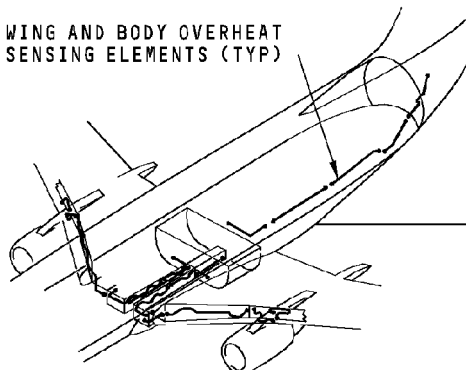
These are the major components of the wing and body overheat detection system:

- Wing/body overheat sensing elements
- Compartment overheat detection controller
- Air conditioning panel.

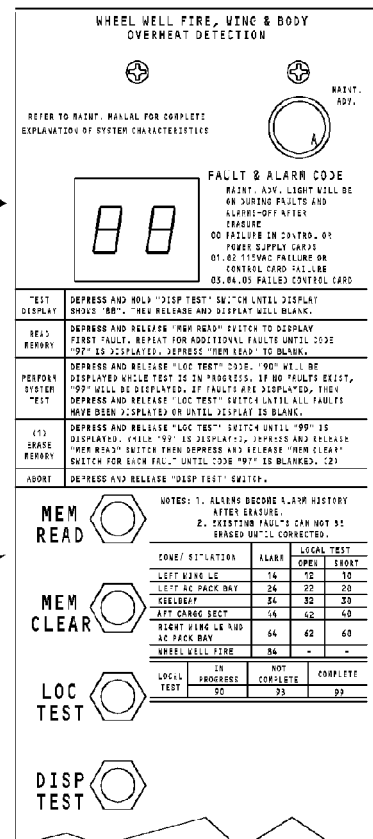
The wing and body overheat detection system uses a single overheat sensing loop.

The detector loop in the left and right wing and body supplies overheat and fault signals to the compartment overheat detection controller. This controller uses the signals to give overheat or fault indications in the flight compartment on the air conditioning panel. The fault signals show on the compartment overheat detection module.

WING AND BODY OVERHEAT
SENSING ELEMENTS (TYP)



AIR CONDITIONING PANEL (P5)



COMPARTMENT OVERHEAT DETECTION
CONTROLLER

FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - GENERAL DESCRIPTION

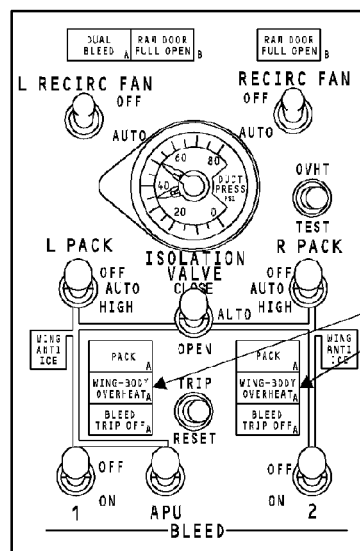
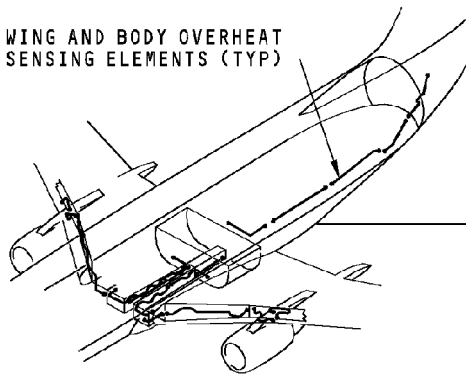
EFFECTIVITY
HAP 101-999

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WING AND BODY OVERHEAT SENSING ELEMENTS (TYP)



AIR CONDITIONING PANEL (P5)

WHEEL WELL FIRE, WING & BODY OVERHEAT DETECTION

REFER TO MAINT. MANUAL FOR COMPLETE EXPLANATION OF SYSTEM CHARACTERISTICS

FAULT & ALARM CODE
MAINT. ADV. LIGHT WILL BE ON DURING FAULTS AND A-ARMS-OFF AFTER FAILURE
00 FAILURE IN CONTROL OR POWER SUPPLY CIRCUIT
01-32 SYSTEM FAILURE IN CONTROL, CNO, OR FAULT
03-99 SYSTEM FAILURE CONTROL CARD

TEST DISPLAY
PRESS AND HOLD "TEST" SWITCH UNTIL DISPLAY SHOWS "BB". THEN RELEASE AND DISPLAY WILL BLANK.

READ MEMORY
PRESS AND RELEASE "MEM READ" SWITCH TO DISPLAY FIRST FAULT. REPEAT FOR ADDITIONAL FAULTS UNTIL CODE "99" IS DISPLAYED. DEPRESS "MEM READ" TO BLANK.

PERFORM SYSTEM TEST
PRESS AND RELEASE "LOC TEST" CODE. "99" WILL BE DISPLAYED WHILE TEST IS IN PROGRESS. IF NO FAULTS EXIST, "99" WILL BE DISPLAYED. IF FAULTS ARE DISPLAYED, THEN DEPRESS AND RELEASE "LOC TEST" SWITCH UNTIL ALL FAULTS HAVE BEEN DISPLAYED OR UNTIL DISPLAY IS BLANK.

LOC TEST
PRESS AND RELEASE "LOC TEST" SWITCH UNTIL "99" IS DISPLAYED. WHILE "99" IS DISPLAYED, DEPRESS AND RELEASE "MEM READ" SWITCH "MEM DEPRESS AND RELEASE" SWITCH FOR EACH FAULT UNTIL CODE "99" IS BLANKED. (2)

ABORT
PRESS AND RELEASE "DISP TEST" SWITCH.

NOTES: 1. ALARMS BECOME ALARM HISTORY AFTER ENROUTE.
2. EXISTING FAULTS CAN NOT BE ERASED UNTIL CORRECTED.

ZONE/ SITUATION	ALARM	LOCAL TEST	
		OPEN	SHORT
LEFT WING LE	16	12	0
LEFT AC PACK BAY	24	22	20
WING-BODY	36	32	30
LEFT CABIN SEC	46	42	40
RIGHT WING LE AND AC PACK BAY	66	62	60
WHEEL WELL FIRE	86	-	-

LOCAL TEST	IN PROGRESS		NOT COMPLETE	
	90	98	99	99
DISP TEST				

MEM READ

MEM CLEAR

LOC TEST

DISP TEST

COMPARTMENT OVERHEAT DETECTION CONTROLLER

FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - GENERAL DESCRIPTION

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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - COMPARTMENT OVERHEAT DETECTION CONTROLLER

Purpose

The compartment overheat detection controller monitors sensing elements for overheat and fire conditions in the wheel well and the wing and body areas.

Physical Description

The control circuits for the wing and body overheat detection are in the controller. The front panel has these components:

- MAINT ADV (maintenance advisory) light
- LED display
- BITE instructions
- Four BITE control switches (MEM READ, MEM CLEAR, LOC TEST and DISP TEST).

Location

The compartment overheat detection controller is in the electronic equipment compartment on the E1-4 rack.

BITE Test Switches and Indications

The non-volatile memory provides a storage area for ten fault/alarms. Failure of the control cards, power supply card, loss of ac or dc power are not stored. These failures have a 00 to 05 code. Short circuit faults are stored as alarm codes.

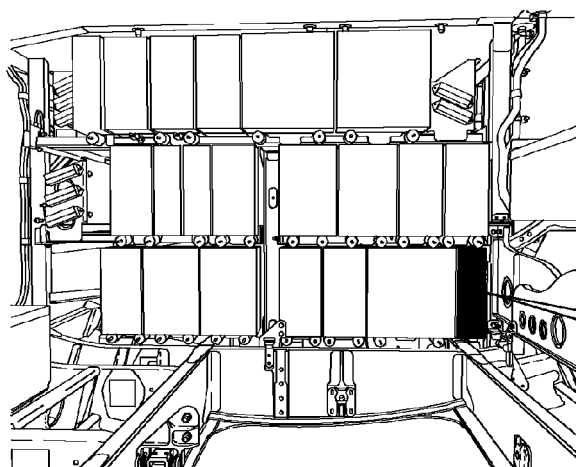
The MEM READ (memory read) switch gets access to the non-volatile memory.

The MEM CLEAR (memory clear) switch clears the non-volatile memory. The existing faults and alarms can not be cleared until corrected.

The LOC TEST (local test) switch starts a test sequence of the control circuits and detector elements. This test will show codes 00 to 05, open loop codes and short loop codes.

The DISP TEST (display test) switch does a check of the control circuits. This shows by code 88.

The MAINT ADV (maintenance advisory) light is on when a fault or an alarm is stored in the non-volatile memory. The light does not come on with codes 00 to 05.



FWD
E/E COMPARTMENT

WHEEL WELL FIRE, WING & BODY OVERHEAT DETECTION

REFER TO MAINT. MANUAL FOR COMPLETE EXPLANATION OF SYSTEM CHARACTERISTICS

MAINT. ADV. LIGHT

FAULT & ALARM CODE
FAULT, ADV. LIGHT WILL BE ON DURING FAULTS AND ALARMS-OFF AFTER ERASING
00 FAILURE IN CONTROL OR POWER SUPPLY CIRCUIT
01.02 TTS/AC PA. LINE OR CONTROL CIRCUIT FAILURE
03.04.05 FAILED CONTROL CARD

TEST DISPLAY
DEPRESS AND HOLD "DISP TEST" SWITCH UNTIL DISPLAY SHOWS "88". THEN RELEASE AND DISPLAY WILL BLANK.

READ MEMORY
DEPRESS AND RELEASE "MEM READ" SWITCH TO DISPLAY FIRST FAULT. REPEAT FOR ADDITIONAL FAULTS UNTIL CODE "99" IS DISPLAYED. DEPRESS "MEM READ" TO BLANK.

PERFORM SYSTEM TEST
DEPRESS AND RELEASE "LOC TEST" CODE. "99" WILL BE DISPLAYED WHILE TEST IS IN PROGRESS. IF NO FAULTS EXIST, "99" WILL BE DISPLAYED. IF FAULTS ARE DISPLAYED, THEN DEPRESS AND RELEASE "LOC TEST" SWITCH UNTIL ALL FAULTS HAVE BEEN DISPLAYED OR "99" IS DISPLAYED.

LOC TEST
DEPRESS AND RELEASE "LOC TEST" SWITCH UNTIL "99" IS DISPLAYED. WHILE "99" IS DISPLAYED, DEPRESS AND RELEASE "MEM READ" SWITCH THEN DEPRESS AND RELEASE "MEM CLEAR" SWITCH FOR EACH FAULT UNTIL CODE "99" IS BLANKED. (2)

MAINT
DEPRESS AND RELEASE "DISP TEST" SWITCH.

NOTES: 1. ALARMS BECOME ALARM HISTORY AFTER CIRCLES.
2. EXISTING FAULTS CAN NOT BE ERASED UNTIL CORRECTED.

ZONE/ SITUATION	ALARM	LOCAL TEST	
		OPEN	SHORT
LEFT WING E	14	12	13
LEFT AC PACK BAY	24	22	23
KEILBEIN	34	32	33
APT CARGO SECT	44	42	43
RIGHT A/D LE AND AC PACK BAY	64	62	63
WHEEL WELL FIRE	84	-	-

LOCAL TEST	NOT COMPLETE	
	PROGRESS	COMPLETE
90	94	99

MEM READ

MEM CLEAR

LOC TEST

DISP TEST

FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - COMPARTMENT OVERHEAT DETECTION CONTROLLER

EFFECTIVITY
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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - FUNCTIONAL DESCRIPTION

Functional Description

The compartment overheat detection controller supplies power to the sensing elements. The microprocessor monitors the wing/body sensing elements for overheat conditions.

If the microprocessor detects a wing/body overheat, it keeps the alarm in memory and sets the overheat condition. These are the indications of a wing/body overheat:

- Left, right amber WING-BODY OVERHEAT light comes on the air conditioning panel
- MASTER CAUTION and AIR COND annunciator lights come on
- MAINT ADV light on the compartment overheat detection controller comes on.

Push and hold the P5 OVHT TEST switch for 5 seconds to start a test of the wing and body overheat detection system. The test alarm inputs are not kept in the memory.

The test does a check of the continuity of the sensing elements. If the sensing element has continuity, the indications are the same as during a real alarm. If the sensing element does not have continuity, there are no indications in the flight compartment.

There is no difference between the real alarm and a short circuit. If there is a short circuit, the indications are the same as for a real alarm.

The faulty sensing element (no continuity or a short circuit) can be found by the coded indications on the compartment overheat detection controller.

Training Information Point

For the indications and test of the wing/body overheat system, 115v ac power must be on.

When you install an element, do not bend the element until the bend radius is less than one inch. If the bend radius is less than one inch, damage to the element can occur.

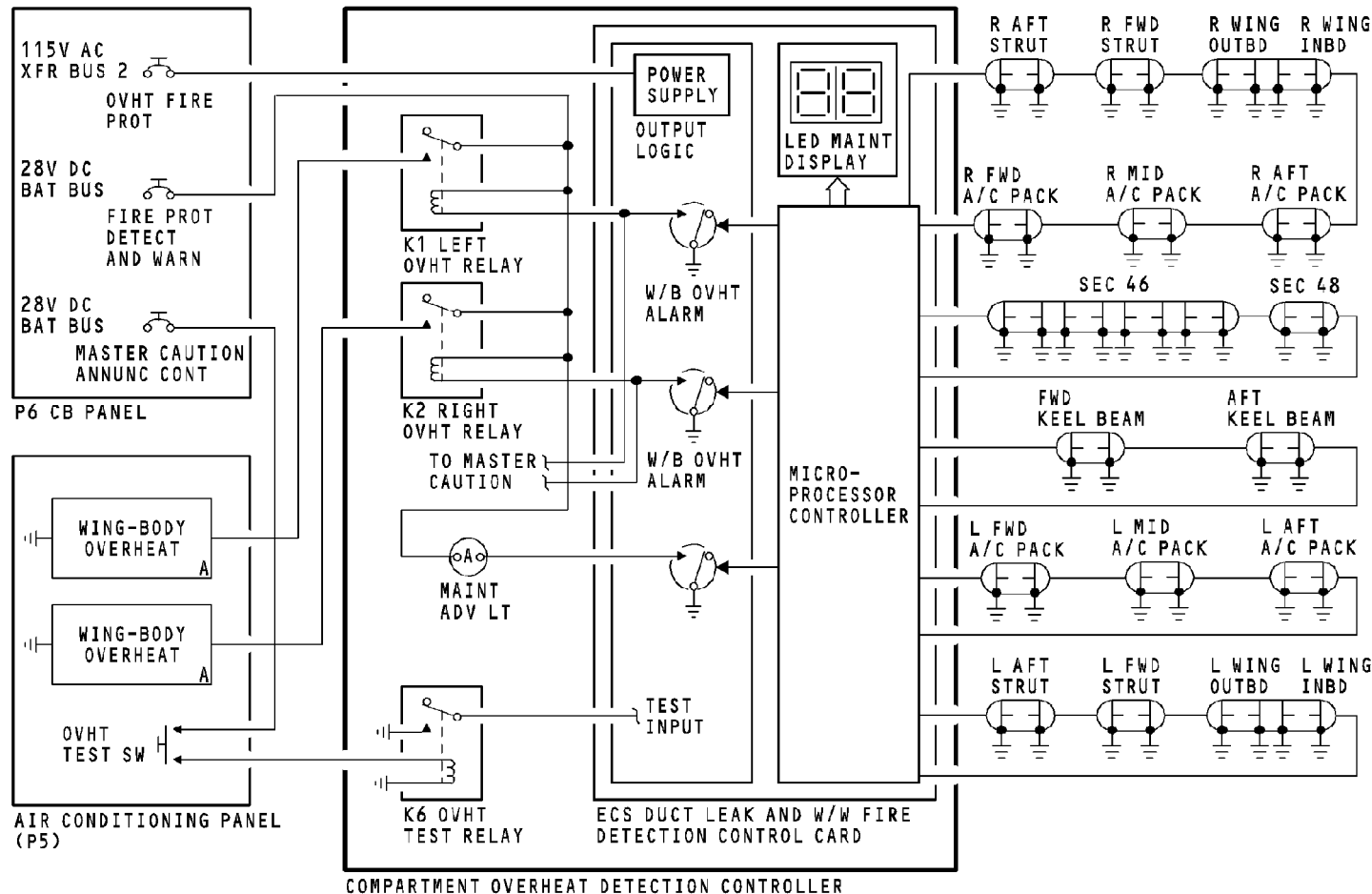
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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - FUNCTIONAL DESCRIPTION**Functional Description**

Overheat sensing elements in the left and right wing/body supply the overheat detection signal. The signal goes to the compartment overheat detection controller. This controller supplies the overheat alarms.

These are the flight compartment indications of a wing and body overheat:

- Left, right amber WING BODY OVERHEAT light on the air conditioning panel come on
- MASTER CAUTION and AIR COND annunciator lights come on.

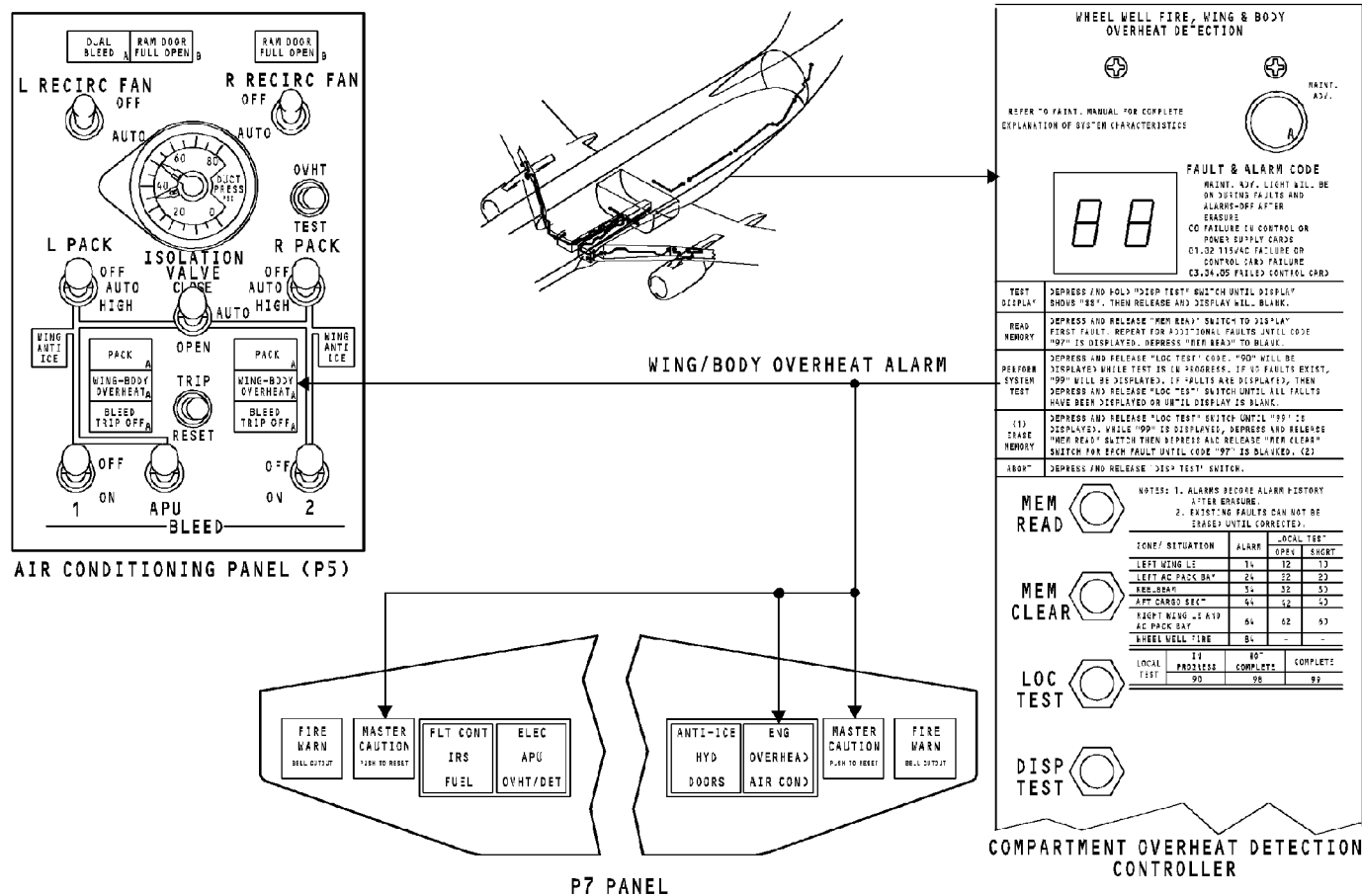
If the wing and body overheat indications come on due to a real overheat or a fault, the MAINT ADV light on the compartment overheat detection controller also comes on. Use the module to do a check for real overheat condition or a fault condition.

Wing and Body Overheat Test

The wing and body overheat detection test is with the OVHT TEST switch on the air conditioning panel. If the test passes, the indications in the flight compartment are the same as for a real overheat condition. If the test fails, use the compartment overheat detection controller to isolate the fault.



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FIRE PROTECTION - WING AND BODY OVERHEAT DETECTION - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - INTRODUCTION**Purpose**

The engine fire extinguishing system puts out fires in the engine compartment.

General Description

The engine fire extinguishing system floods the engine compartments with halon to put out the fire. Two fire extinguisher bottles supply the halon to either engine.

Physical Description

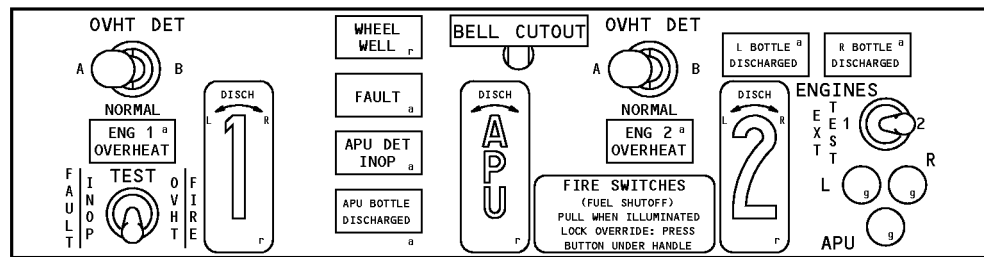
These are the components of the engine fire extinguishing system:

- Engine and APU fire control panel
- Fire extinguisher bottles (2)
- Engine fire extinguishing ports.

Location

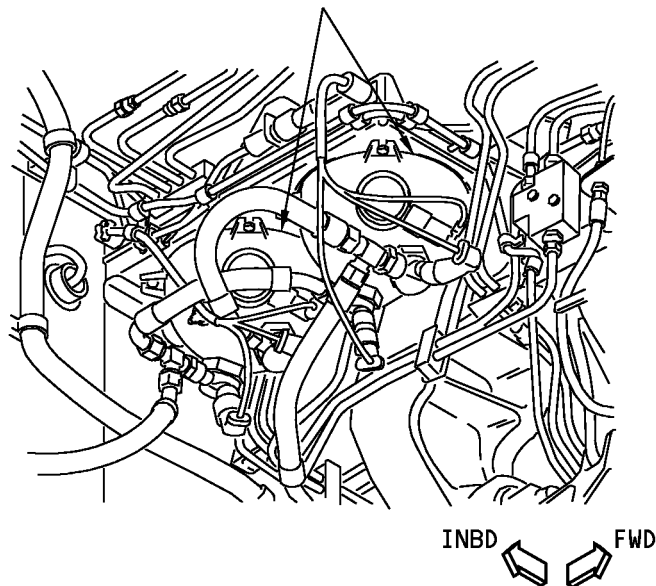
The two engine fire extinguisher bottles are in the top left corner of the main wheel well.

The engine and APU fire control panel is in the flight compartment on the P8 panel.



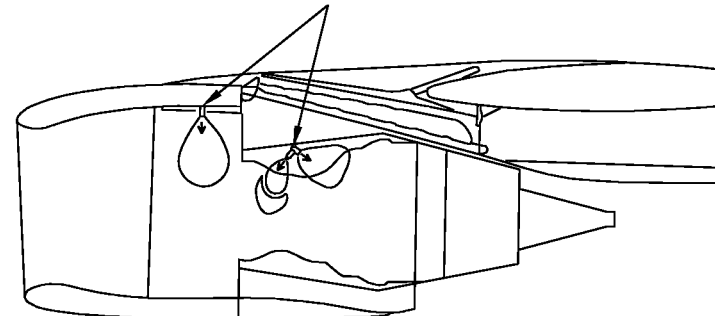
ENGINE AND APU FIRE CONTROL PANEL (P8)

**ENGINE FIRE
EXTINGUISHER
BOTTLES**



MAIN WHEEL WELL

**ENGINE FIRE
EXTINGUISHING
PORTS**



FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - INTRODUCTION

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - OPERATION**Operation**

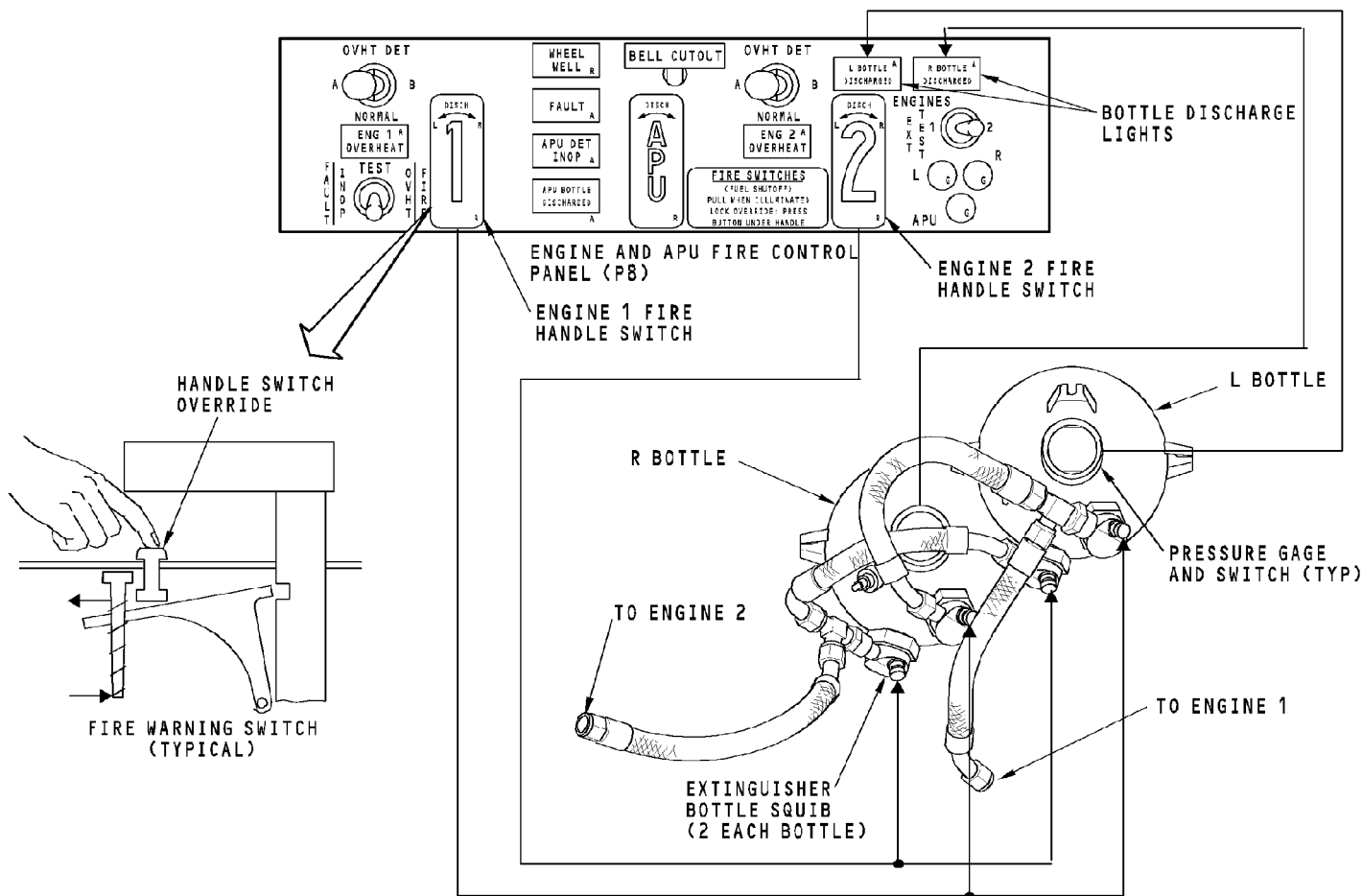
When there is an overheat or fire condition, the fire handle switch for that engine unlocks. You can also use the handle switch override under the handle to unlock the fire handle switch. When you pull the switch up, the engine systems are shutdown and isolated for safety.

Engine 1 Fire Extinguishing

When you turn the engine 1 (left) fire handle switch clockwise, the extinguisher bottle squib 1 on the R bottle operates. This breaks a seal and sends the halon in the R bottle to engine 1. If you turn the same engine fire handle switch counter-clockwise, the extinguisher bottle squib 1 on the L bottle operates. This sends the halon in the L bottle to engine 1. When an engine fire extinguisher bottle is empty, the amber BOTTLE DISCHARGED light on the engine and APU fire control panel comes on.

Engine 2 Fire Extinguishing

The engine 2 (right) fire extinguishing system operates the same as engine 1. The engine 2 fire handle switch causes the squib 2 on the L or R bottle to operate.



FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - OPERATION

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - EXTINGUISHER BOTTLE

Purpose

The engine fire extinguisher bottles contain halon that extinguishes an engine fire.

Physical Description

The engine fire extinguisher bottles are spherical. Each bottle contains halon and nitrogen at a pressure of 800 psi at a temperature of 70F (21C). These are the components of each engine fire extinguisher bottle:

- Pressure gage and switch
- Safety relief port
- Two electrical connections
- Two discharge ports with squibs.

Each bottle has two discharge assemblies (squibs) connected to the discharge tubing. The discharge tubing with check valves sends the extinguisher agent to the left and right engine from each bottle.

Location

The two engine fire extinguisher bottles are in the main wheel well. The bottles attach to brackets in the top left corner of the main wheel well.

Operation

When you pull up and turn the engine fire warning switch, you operate the squib. The squib breaks a seal in the bottle. This causes the bottle to release halon. The halon gas flows from the bottle to the selected engine compartment. You can send halon from either one or both bottles to the same engine.

If the bottle temperature increases to 266F (130C), the safety relief port ruptures. This releases halon into the wheel well.

Training Information Point

The discharge tubing fittings from the two fire extinguisher bottles are different size. Also the tubing has colored tape, yellow for engine 1 and blue for engine 2.

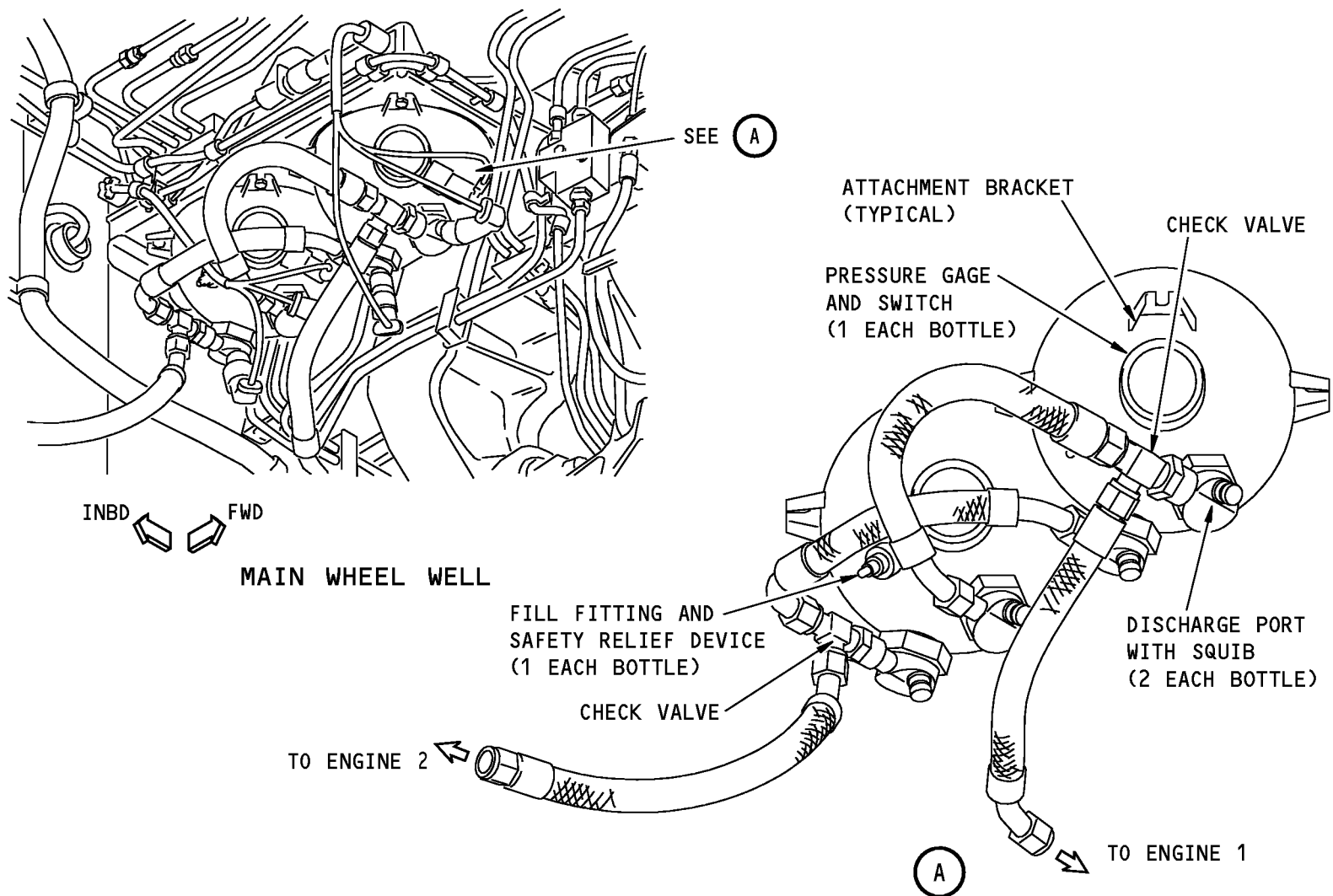
WARNING: MAKE SURE THERE ARE CAPS OR SHUNT PLUGS INSTALLED ON THE SQUIBS WHEN YOU TOUCH OR MOVE THE SQUIBS. THE SQUIB IS AN EXPLOSIVE DEVICE AND CAN CAUSE INJURY IF IT IS ACCIDENTALLY FIRED.

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - EXTINGUISHER BOTTLE

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - EXTINGUISHER BOTTLE SQUIB**Purpose**

The purpose of the squib is to break the diaphragm seal and start the release of the halon gas from the bottle.

Physical Description

The squib is an explosive device that operates electrically. It is adjacent to a bottle diaphragm that can break. The diaphragm normally seals the pressurized bottle.

Location

The squibs are in the discharge assembly at the bottom of the extinguisher bottles.

Functional Description

A squib operates when you turn a fire warning switch. The explosion breaks open the diaphragm. The nitrogen pressure in the bottle pushes the halon through the discharge port.

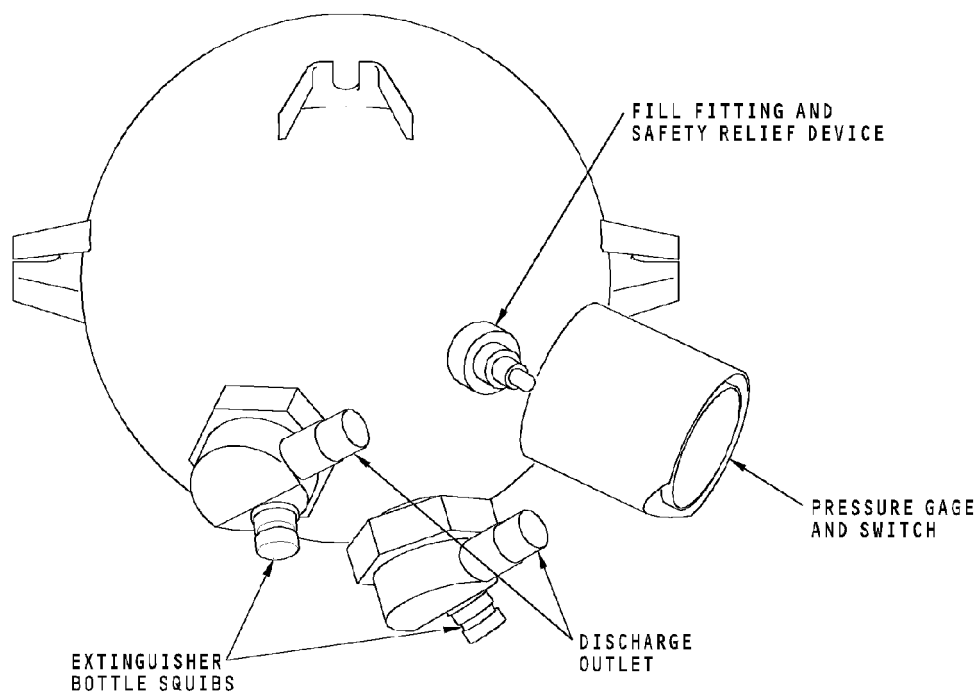
WARNING: MAKE SURE THERE ARE CAPS OR SHUNT PLUGS INSTALLED ON THE SQUIBS WHEN YOU TOUCH OR MOVE THE SQUIBS. THE SQUIB IS AN EXPLOSIVE DEVICE AND CAN CAUSE INJURY IF IT IS ACCIDENTALLY FIRED.

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - EXTINGUISHER BOTTLE SQUIB

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - OVERHEAT/FIRE PROTECTION PANEL

Purpose

The engine and APU fire control panel monitors the fire protection system for these conditions:

- Engine overheat
- Engine fire
- APU fire
- Wheel well fire
- L bottle discharge
- R bottle discharge
- APU bottle discharge
- Engine fire protection fault
- APU fire protection fault.

The engine and APU fire control panel lets you do these functions:

- Set the mode of operation (single or dual loop operation)
- Operation of the fire extinguisher bottles
- Do a test of the fire extinguisher bottle squibs
- Do a test of the fire protection system
- Do a test of the fault detection circuits
- Stop the fire alarm bell.

Physical Description

These are the components of the engine and APU fire control panel:

- Engine and APU fire handle switches
- OVHT DET switches

- FAULT/INOP test switch
- OVHT/FIRE test switch
- EXT TEST switch
- Bell CUTOFF switch.

Location

The engine and APU fire control panel is on the P8 panel.

Operation Indications

These are the indications on the engine and APU fire control panel:

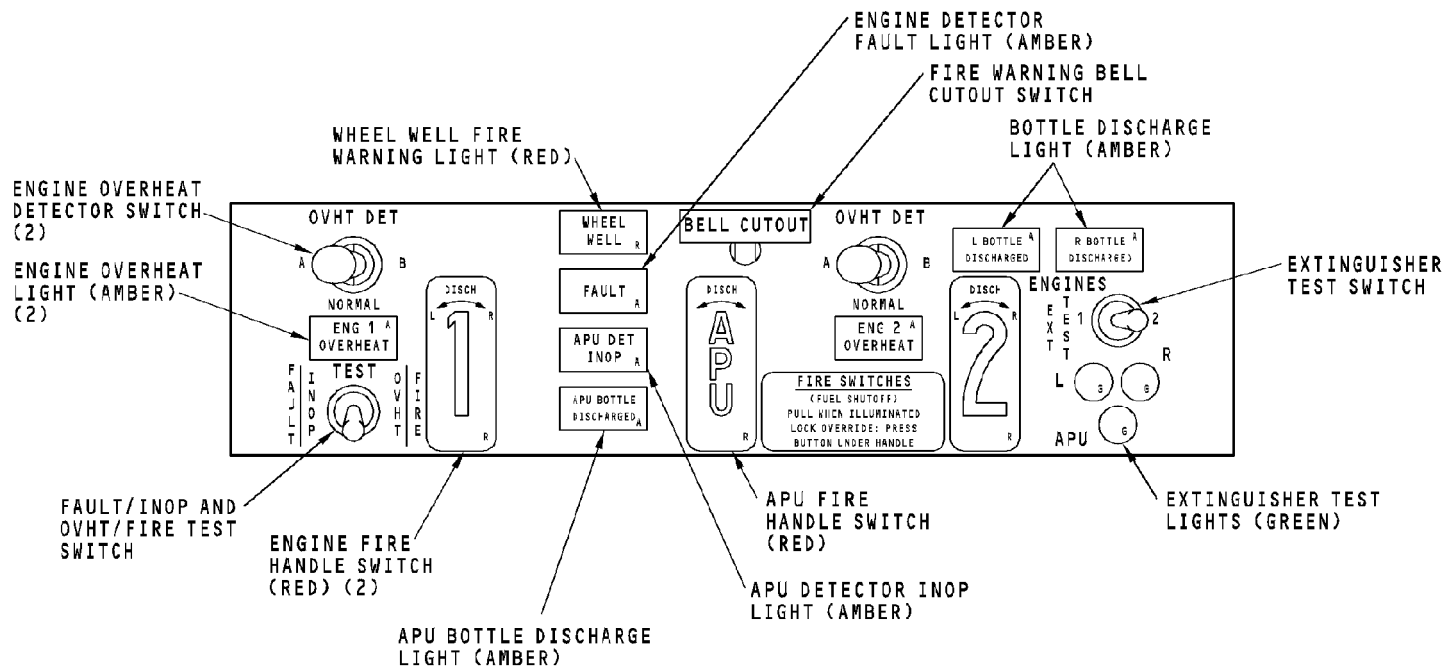
- WHEEL WELL fire warning light, comes on for a wheel well fire condition
- ENG OVERHEAT light comes on for an engine overheat condition
- Fire handle switch lights come on for an engine fire condition
- Bottle discharge lights come on when an extinguisher bottle is discharged
- FAULT light comes on to show a fault condition in the engine fire detection system
- APU DET INOP light comes on to show a fault condition in the APU fire detection system
- EXT TEST lights come on after you do a successful squib continuity test.

Operation Controls

These are the controls on the engine and APU fire control panel:

FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - OVERHEAT/FIRE PROTECTION PANEL

- Fire handle switches show fire indication and control fire extinguisher squibs
- TEST switch lets you to do two tests. One test is for the fault detection circuits. The other test is for the fire detector loops
- OVHT DET switches let you select the mode of operation, loop A or loop B. You may also select NORMAL for both loops
- EXT TEST switch lets you do a check of the extinguisher bottle squibs for continuity.



FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - OVERHEAT/FIRE PROTECTION PANEL

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

Functional Description

When there is an overheat or fire condition, the related engine fire handle switch on the engine and APU fire control panel unlocks. You can also use the manual override under the handle to unlock the fire warning switch. When you pull the switch up, these functions occur:

- High pressure fuel valve in HMU closes
- Spar fuel valve closes
- Thrust reverser control power goes off
- Engine driven hydraulic pump shutoff valve closes
- Hydraulic system low pressure indication inhibited
- Pneumatic pressure regulating and shutoff valve closes
- Generator trips off.

When you turn the engine 1 fire handle switch clockwise, 28v dc goes to the R bottle dual squib 1. This releases halon which goes from the bottle to engine 1. If you turn the same engine fire handle switch counter-clockwise, 28v dc goes to the L bottle dual squib 1. This releases halon which goes from the bottle to engine 1.

When an engine fire extinguisher bottle pressure is less than 250 psi, the bottle pressure switch closes. The related BOTTLE DISCHARGED amber light on the overheat/fire protection panel comes on.

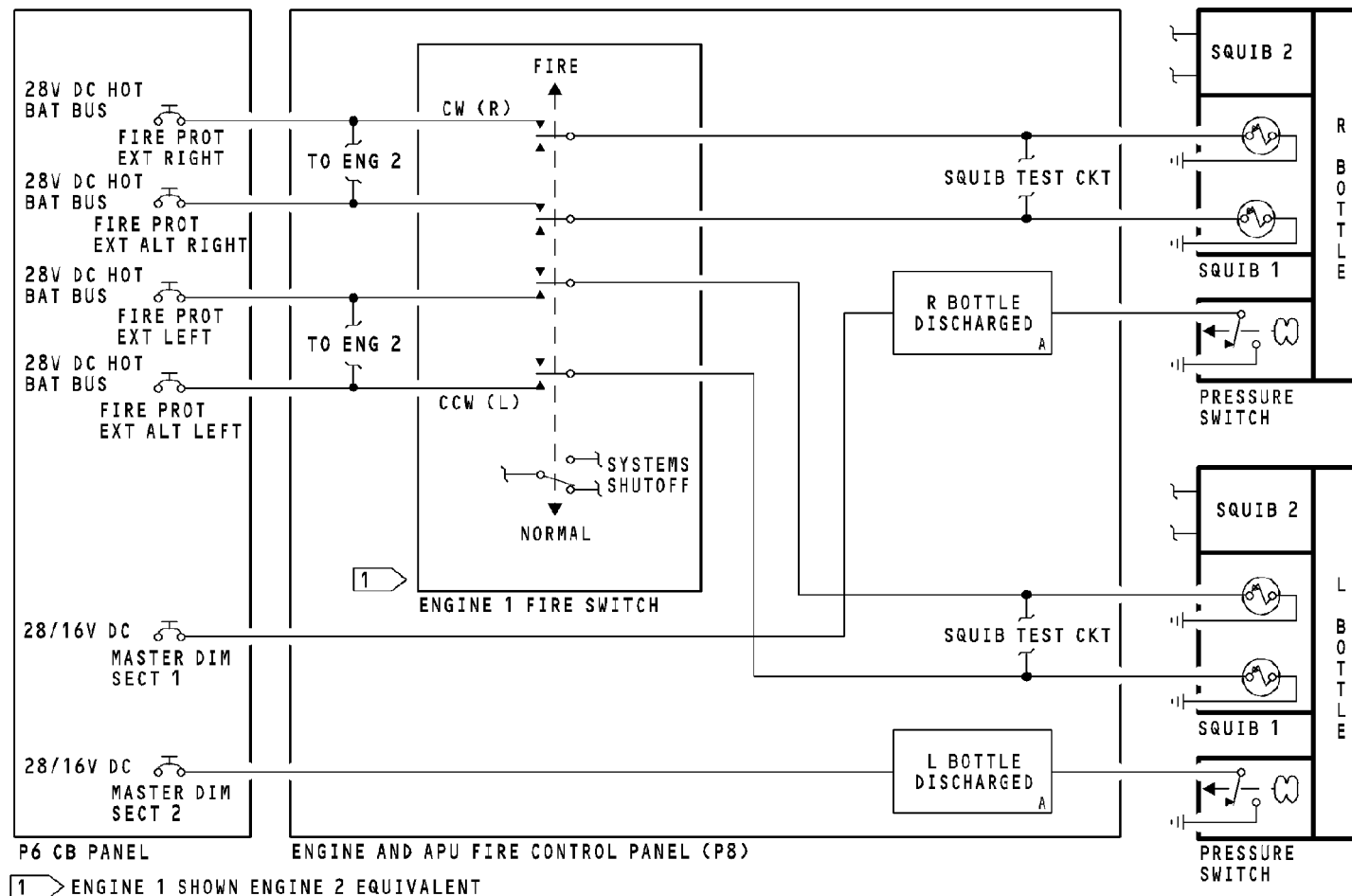
The engine 2 fire extinguishing system operates the same as engine 1. The difference is that the engine 2 fire warning switch sends 28v dc to the R or L bottle squib 2.

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - ENGINE AND APU FIRE EXTINGUISHER TEST

Purpose

The engine and APU fire extinguisher test does a check for fire extinguisher bottle squib continuity. This test makes sure squib servicing is not necessary.

Physical Description

The engine and APU fire extinguisher test uses these components:

- Three-position toggle switch, spring loaded to the neutral position
- L bottle test green light comes on
- R bottle test green light comes on
- APU bottle test green light comes on.

Location

The engine and APU fire extinguisher test switch and three green lights are on the engine and APU fire control panel.

Operation

When you set the EXT TEST switch to the 1 position, a test of these squibs occurs:

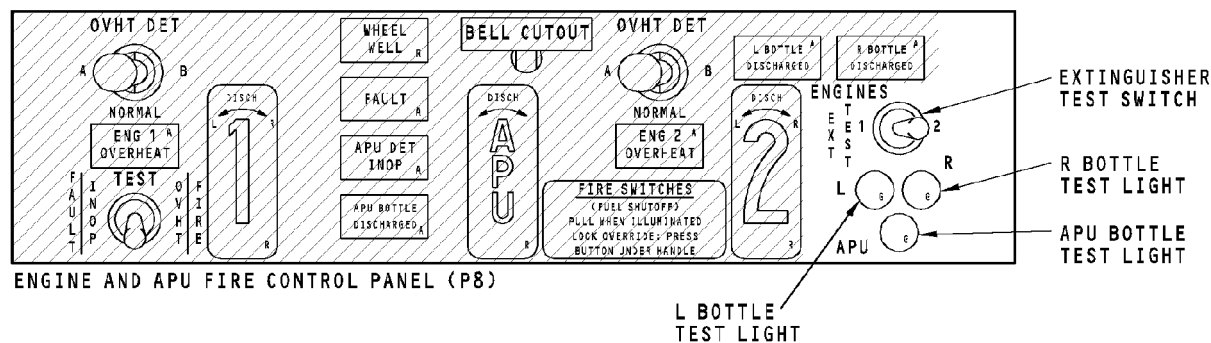
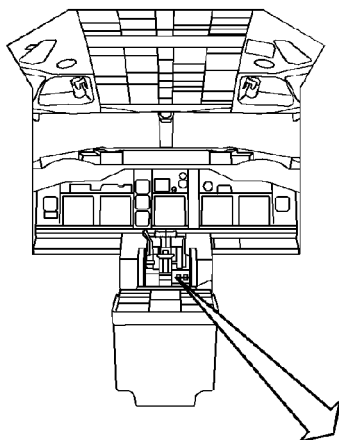
- L bottle number 1 squib
- R bottle number 1 squib
- APU bottle squib.

When you set the EXT TEST switch to the 2 position, a test of these squibs occurs:

- L bottle number 2 squib
- R bottle number 2 squib
- APU bottle squib.

The green test lights come on to show a successful test.

NOTE: You test the same APU bottle squib with the switch in the 1 or 2 position. The green test lights have a push-to-test function.



FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - ENGINE AND APU FIRE EXTINGUISHER TEST

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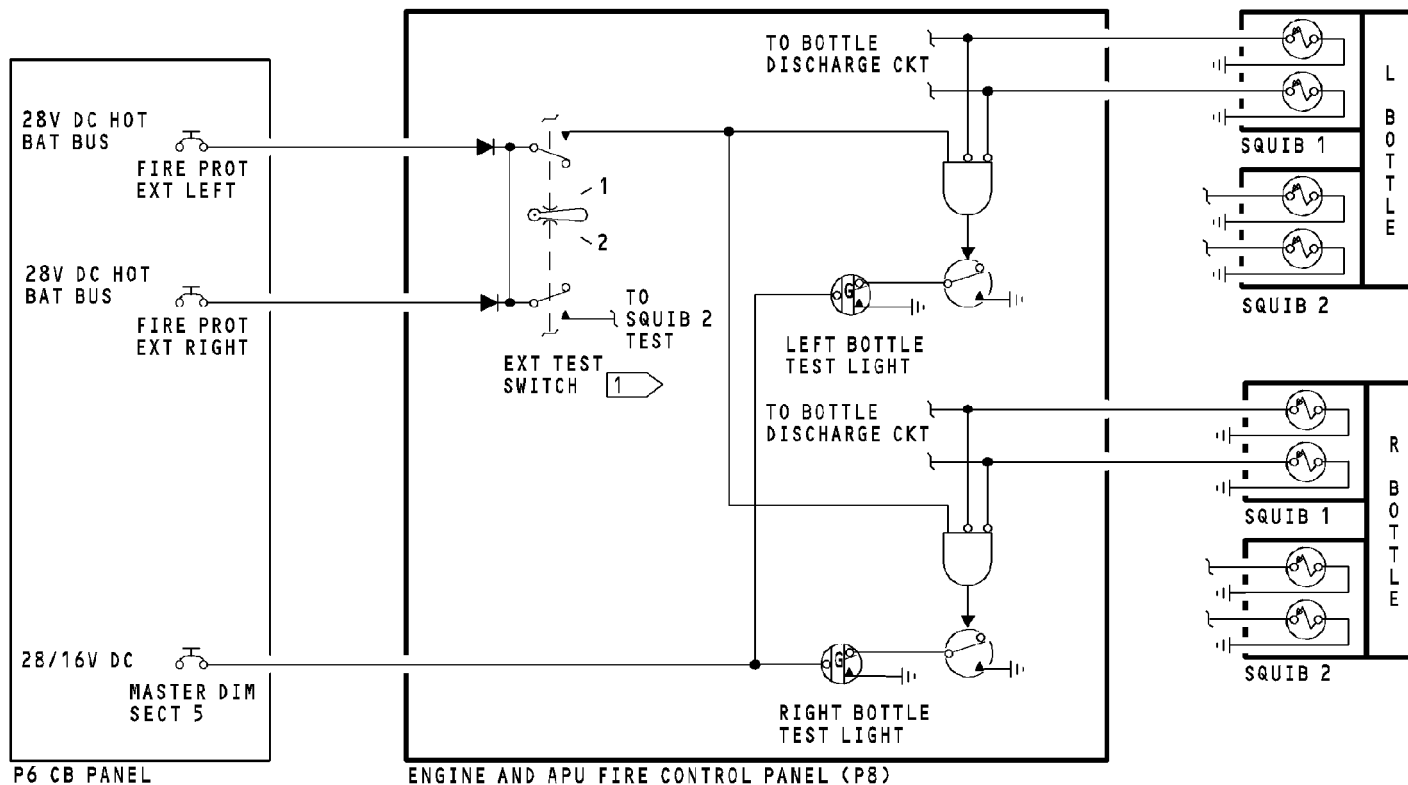
FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - ENGINE EXTIN TEST - FUNCTIONAL DESCRIPTION

Functional Description

When you hold the EXT TEST switch in position 1, power goes to two logic circuits in the engine and APU fire control panel. The dual No. 1 squibs on the left and right fire extinguishing bottles are also connected to the logic circuits. When there is electrical continuity through the dual squib, a green light comes on. If the green light does not come on during test, the squib has to be replaced.

When you hold the EXT TEST switch in position 2, the dual No. 2 squibs test is done for electrical continuity on the left and right engine fire extinguisher bottles.

NOTE: You do a test of the APU fire extinguisher bottle squib from position 1 and 2 of the EXT TEST switch.



1 EXT TEST SWITCH POSITION 1 SHOWN, POSITION 2 THE SAME

FIRE PROTECTION - ENGINE FIRE EXTINGUISHING - ENGINE EXTIN TEST - FUNCTIONAL DESCRIPTION

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FIRE PROTECTION - APU FIRE EXTINGUISHING - INTRODUCTION**Purpose**

The APU fire extinguishing system extinguishes fires in the APU compartment.

General Description

The APU fire extinguishing system floods the APU compartment with halon to extinguish the fire. One fire extinguisher bottle supplies the halon to the APU compartment.

Physical Description

These are the components of the APU fire extinguishing system:

- Engine and APU fire control panel
- APU fire extinguishing bottle
- APU remote control panel.

Location

The APU fire extinguishing bottle is in the horizontal stabilizer accessory compartment.

The engine and APU fire control panel is in the flight compartment on the P8 panel.

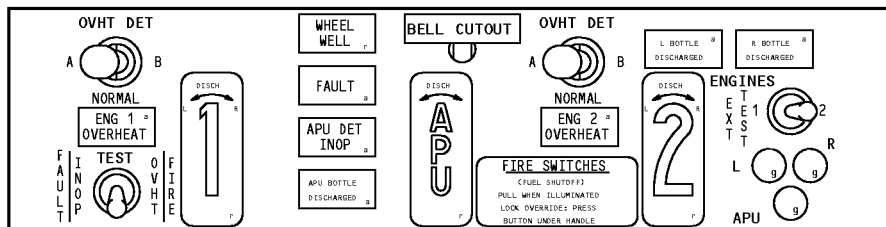
The APU remote control panel P28 is in the right main wheel well, on the aft bulkhead.

EFFECTIVITY
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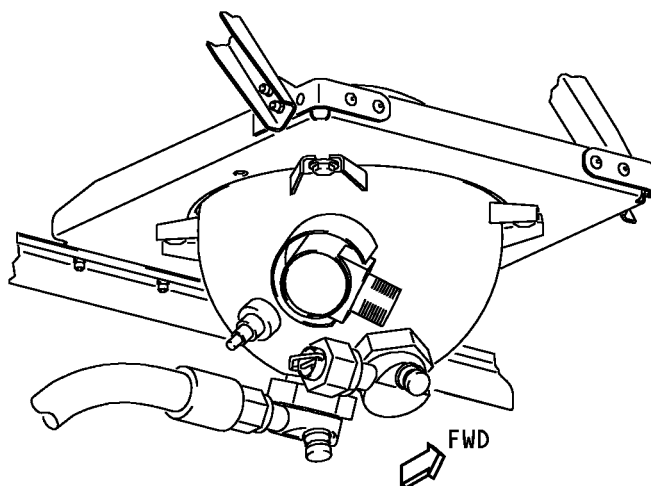
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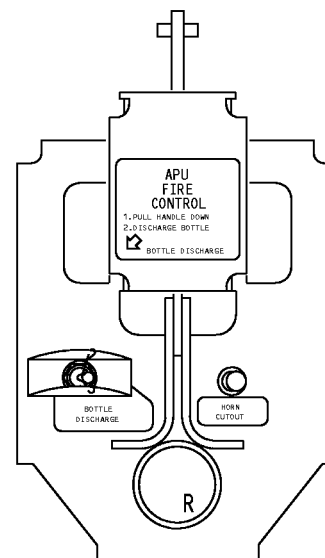
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ENGINE AND APU FIRE CONTROL PANEL (P8)



**APU FIRE EXTINGUISHING BOTTLE
(HORIZONTAL STABILIZER ACCESSORY COMPARTMENT)**



**APU REMOTE CONTROL PANEL, P28
(RIGHT MAIN WHEEL WELL)**

FIRE PROTECTION - APU FIRE EXTINGUISHING - INTRODUCTION

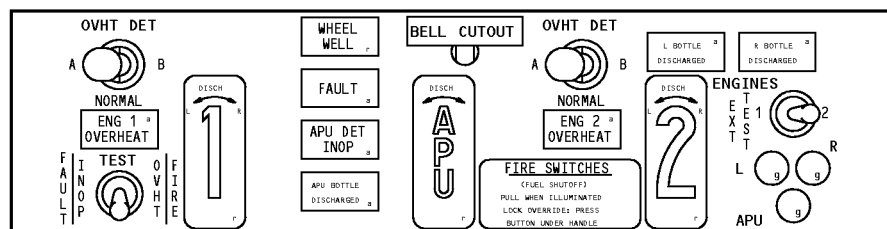
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HAP 031-054, 101-999

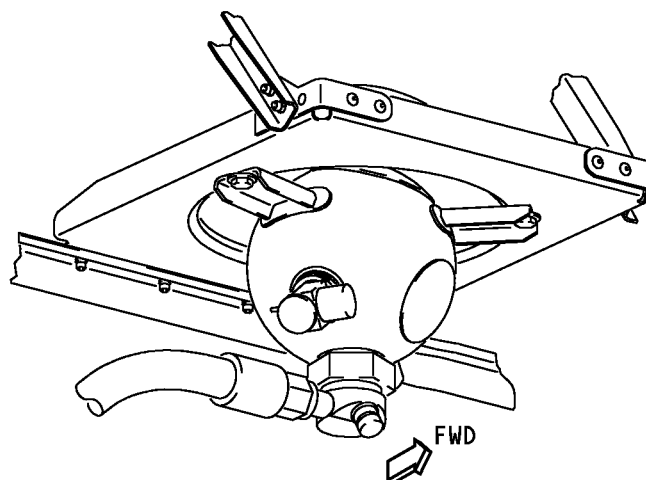
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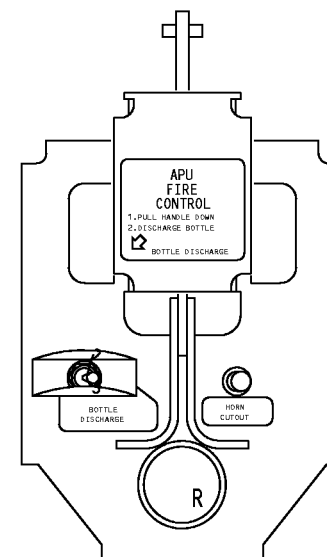
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ENGINE AND APU FIRE CONTROL PANEL (P8)



**APU FIRE EXTINGUISHING BOTTLE
(HORIZONTAL STABILIZER ACCESSORY COMPARTMENT)**



**APU REMOTE CONTROL PANEL, P28
(RIGHT MAIN WHEEL WELL)**

FIRE PROTECTION - APU FIRE EXTINGUISHING - INTRODUCTION

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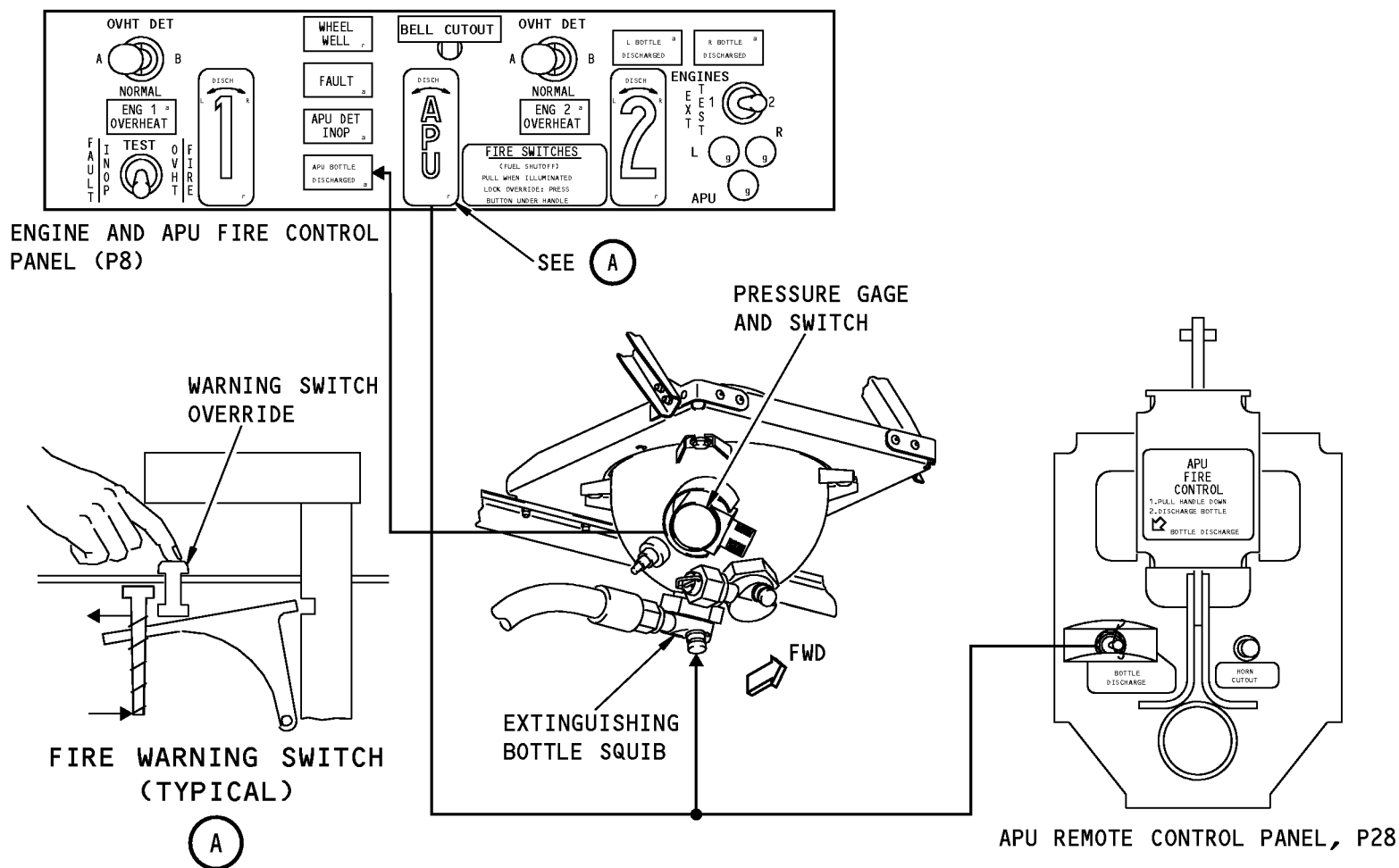
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FIRE PROTECTION - APU FIRE EXTINGUISHING - OPERATION

Operation

When there is a fire condition, the APU fire warning switch unlocks. You can also use the warning switch override under the handle to unlock the switch. When you pull the APU fire warning switch up, the APU systems are shutdown and isolated.

When you turn the APU fire handle switch clockwise or counter-clockwise, the extinguisher bottle squib operates. This breaks the seal and lets the halon in the bottle to go to the APU compartment. You can also use the engine and APU fire control panel to operate the APU fire extinguisher bottle. When the APU fire extinguisher bottle is empty, the amber APU BOTTLE DISCHARGED light on the engine and APU remote control panel comes on.



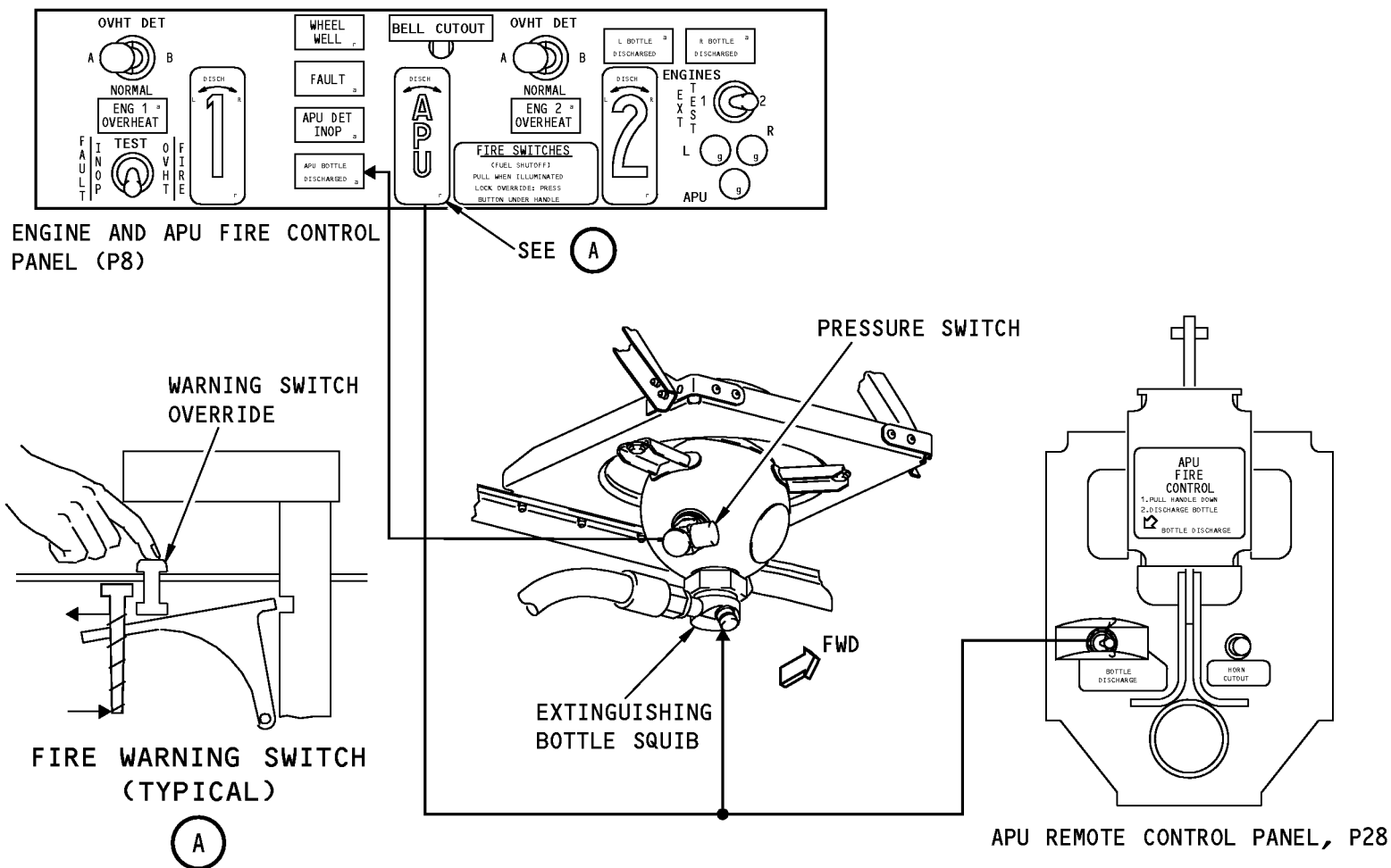
FIRE PROTECTION - APU FIRE EXTINGUISHING - OPERATION

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FIRE PROTECTION - APU FIRE EXTINGUISHING - OPERATION

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHING BOTTLE

Purpose

The APU fire extinguishing bottle contains halon that extinguishes an APU fire.

Physical Description

HAP 031-054, 101-999

The APU fire extinguishing bottle is spherical. The bottle contains halon under a nitrogen pressure of 800 psi at a temperature of 70F (21C). These are the components of the APU fire extinguishing bottle:

- Pressure gage and switch
- Fill fitting and safety relief device
- Two electrical connectors
- Two discharge ports with squibs.

HAP 001-013, 015-026, 028-030

The APU fire extinguishing bottle is spherical. The bottle contains halon under a nitrogen pressure of 600 psi at a temperature of 70F (21C). These are the components of the APU fire extinguishing bottle:

- Pressure switch
- Fill fitting and safety relief device
- Electrical connector
- Discharge port with squib.

HAP 031-054, 101-999

Only one electrical connector and discharge port is used. The second electrical connector is capped and the discharge port is also capped.

HAP ALL

Location

The APU fire extinguishing bottle is in the horizontal stabilizer accessory compartment.

Operation

When you pull up and turn the APU fire warning switch in any direction or move the toggle switch on the panel in the wheel well, you operate the squib. The squib breaks a seal in the bottle. This causes the bottle to release halon to the APU compartment.

HAP 031-054, 101-999

If the bottle temperature increases to 266F (130C) or bottle pressure to approximately 1800 psi, the safety relief port breaks open.

HAP 001-013, 015-026, 028-030

If the bottle temperature increases to 200F (93C) or bottle pressure to approximately 1800 psi, the safety relief port breaks open.

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHING BOTTLE

HAP 001-013, 015-026, 028-030 (Continued)

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This blows out the disc and discharges the halon into the accessory compartment.

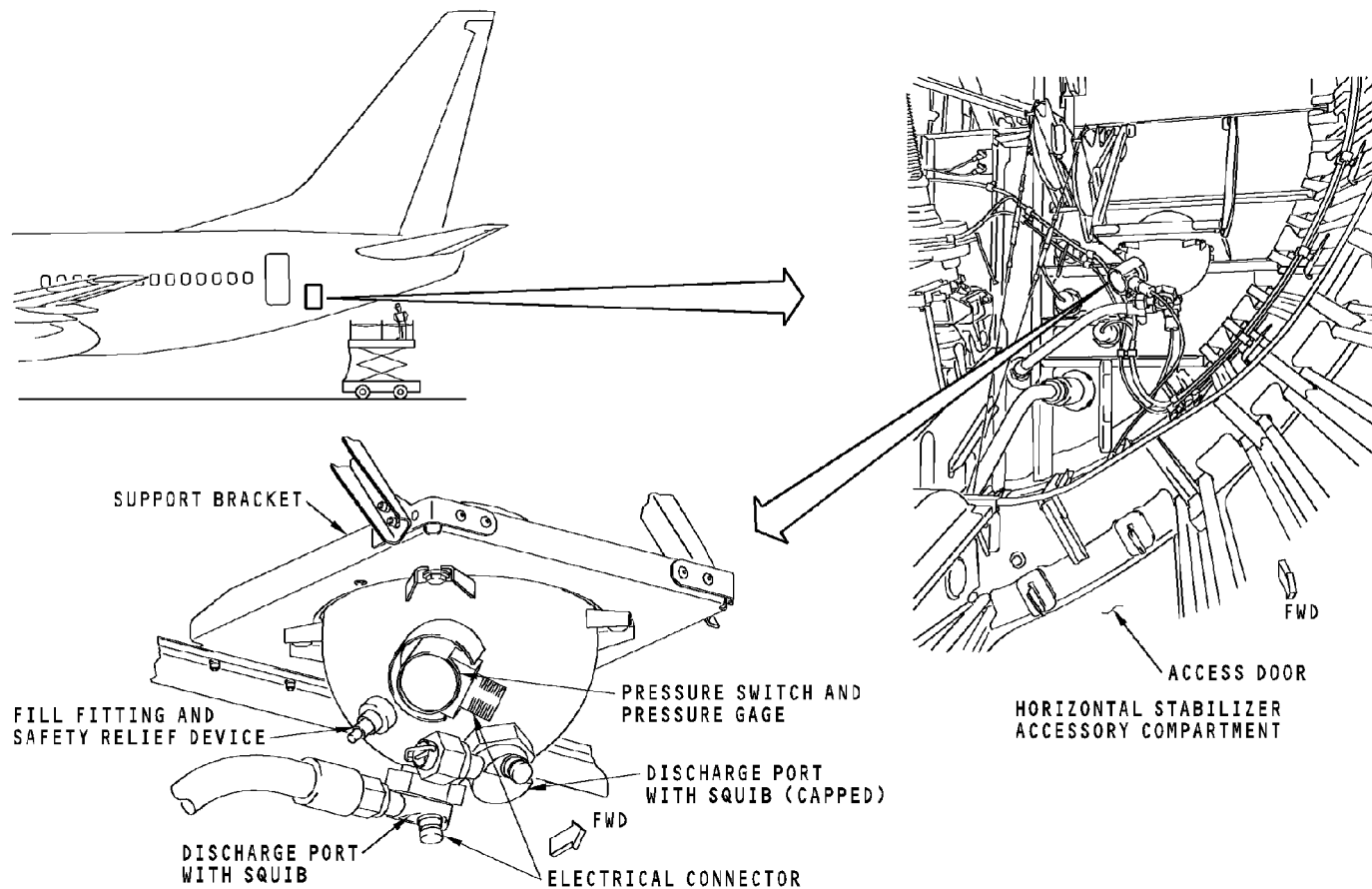
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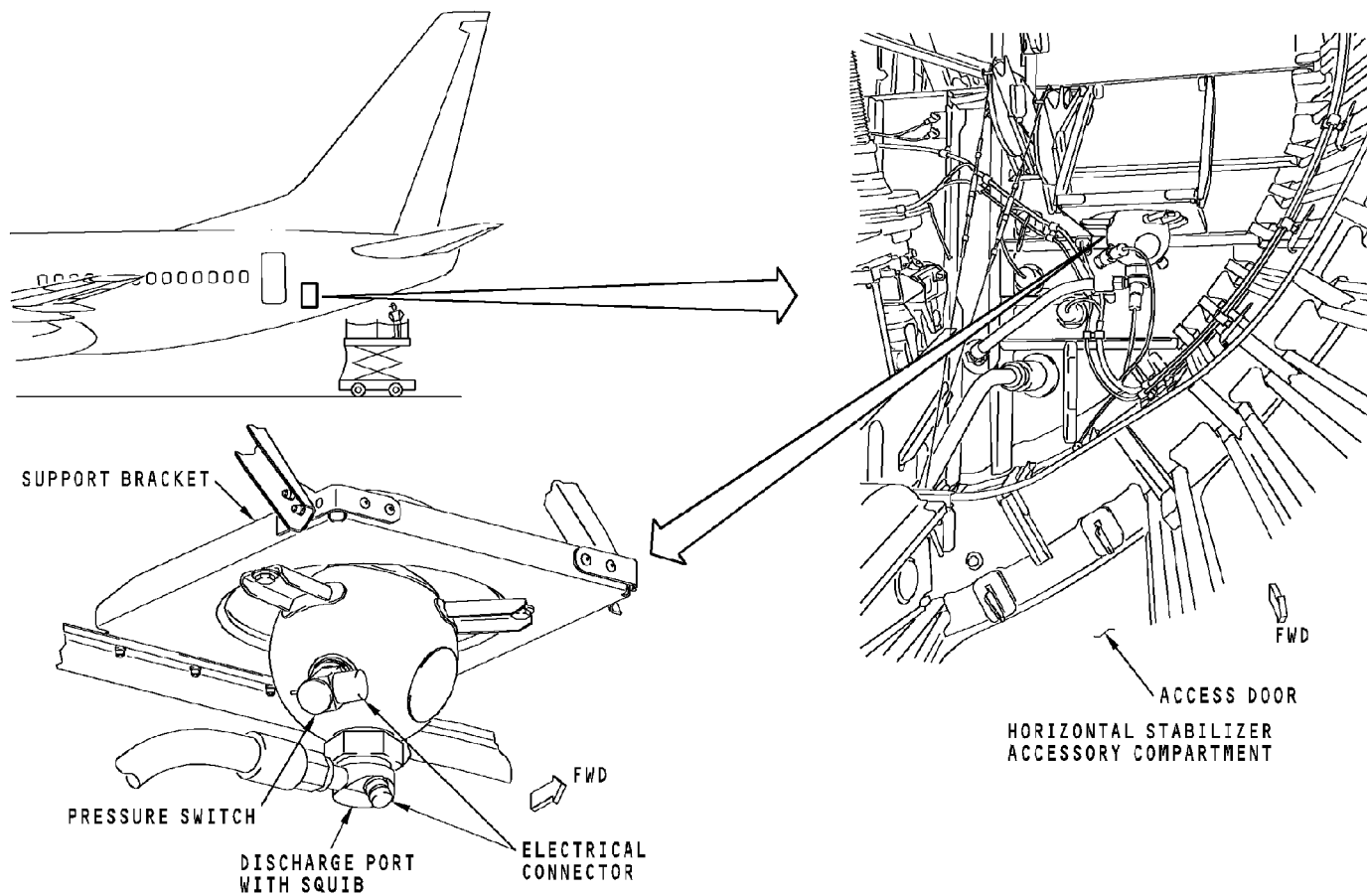
FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHING BOTTLE

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHING BOTTLE

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHER BOTTLE SQUIB**Purpose**

The purpose of the squib is to break the diaphragm in the bottle and start the release of the halon gas.

Physical Description

The squib is an explosive device that operates electrically. It is adjacent to a bottle diaphragm that can break. The diaphragm normally seals the pressurized bottle.

Location

The squib is in the discharge assembly at the bottom of the fire bottle.

Functional Description

Electrical power goes to the squib during the fire extinguisher operation. An explosion of the squib opens the diaphragm. Nitrogen pressure in the bottle pushes the halon through the discharge port.

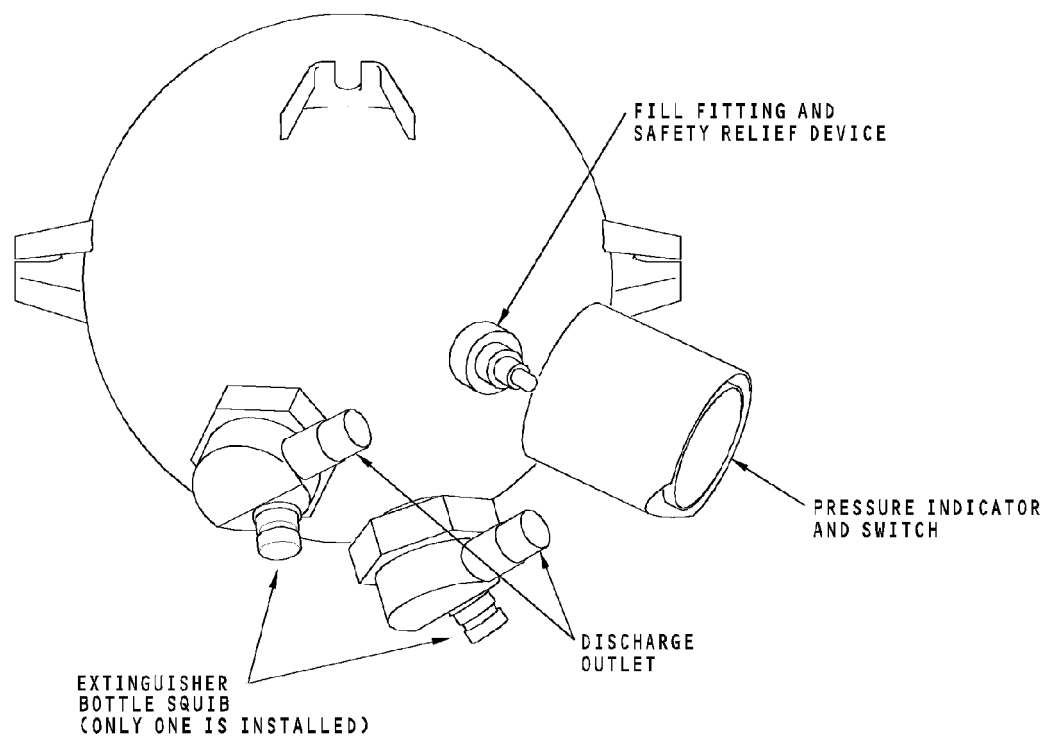
WARNING: MAKE SURE THERE ARE CAPS OR SHUNT PLUGS INSTALLED ON THE SQUIBS WHEN YOU TOUCH OR MOVE THE SQUIBS. THE SQUIB IS AN EXPLOSIVE DEVICE AND CAN CAUSE INJURY IF IT IS ACCIDENTALLY FIRED.

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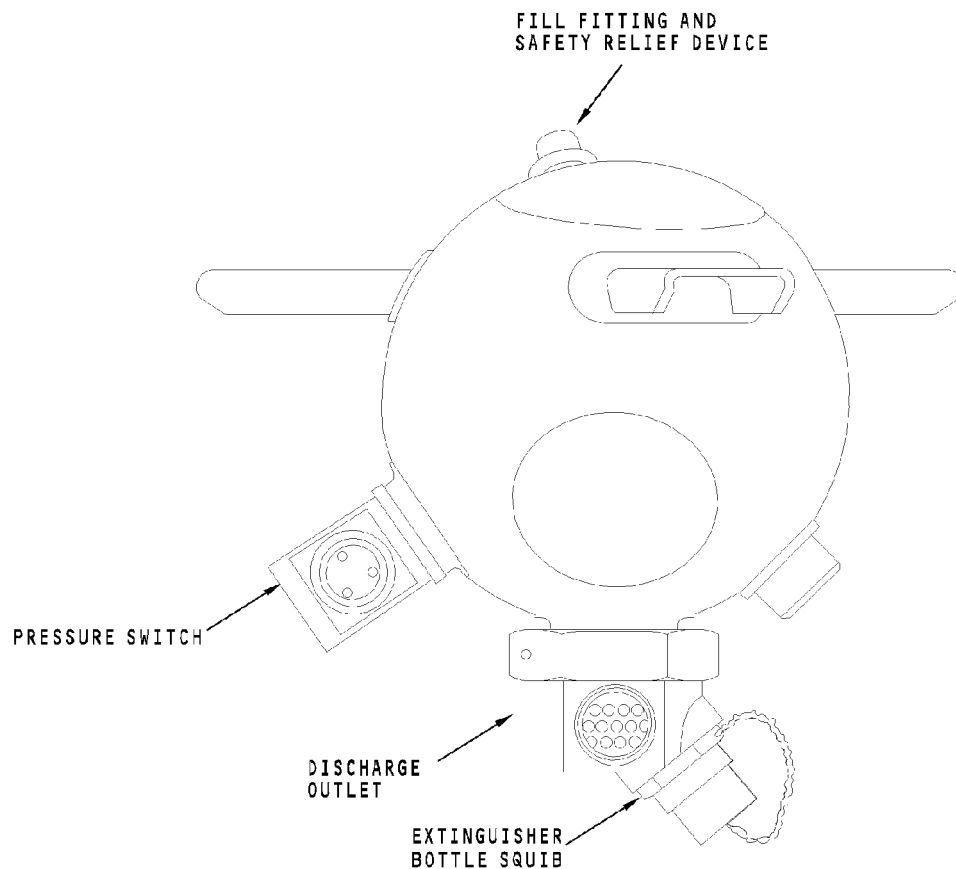
FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHER BOTTLE SQUIB

EFFECTIVITY
HAP 031-054, 101-999

26-22-00

D633A101-HAP

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU FIRE EXTINGUISHER BOTTLE SQUIB

EFFECTIVITY

HAP 001-013, 015-026, 028-030

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU GROUND CONTROL PANEL

Purpose

On the ground, the APU remote control panel gives you visual and aural indications of an APU fire. The control panel also lets you extinguish an APU fire.

Physical Description

The APU remote control panel has these components:

- Red fire warning light
- Fire horn
- Horn cutout switch
- APU fire control handle
- Bottle discharge switch.

Operation

When there is a fire in the APU, the horn and light operate alternately and the APU stops. The horn does not operate in flight.

When you push the horn cutout button, the horn sound stops and the red light stays on continuously as long as APU is on fire.

When you pull the APU fire control handle, the APU system stops and isolates from other systems.

When you pull down the APU fire control handle, you arm the fire extinguisher toggle switch. You use the toggle switch to discharge the APU fire extinguisher bottle to the APU compartment.

Training Information Point

The APU fire control handle can be used to stop the APU in emergency. The fire extinguisher bottle will not discharge.

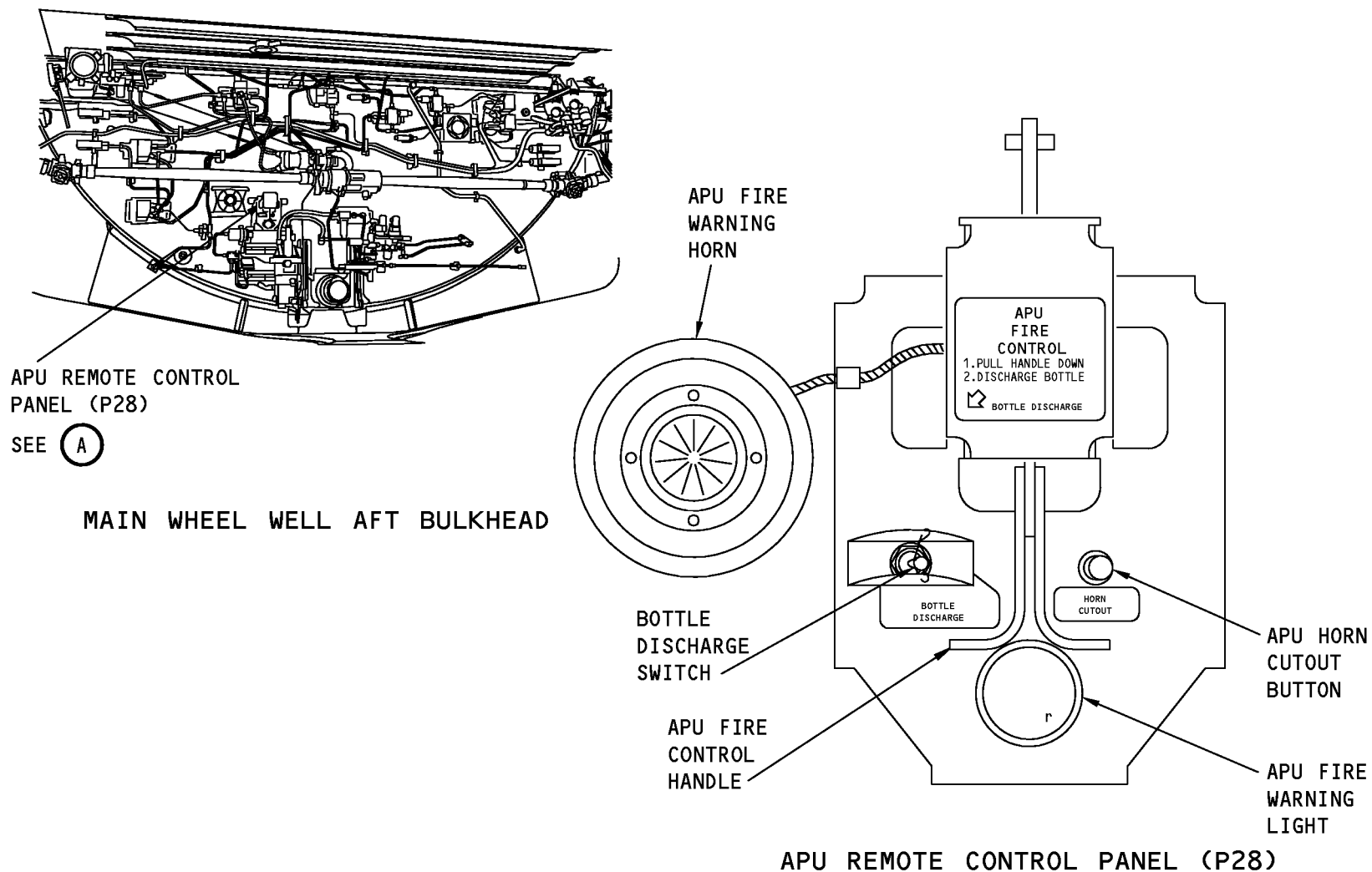
The bottle discharge switch has a witness wire. This wire protects against accidental operation of the discharge switch. Broken wire shows switch movement and possible squib operation.

EFFECTIVITY
HAP ALL

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FIRE PROTECTION - APU FIRE EXTINGUISHING - APU REMOTE CONTROL PANEL

EFFECTIVITY
HAP ALL

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FIRE PROTECTION - APU FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

Functional Description

When there is a fire condition, the APU fire handle switch on the engine and APU fire control panel unlocks. When you pull the APU fire warning handle switch up, a signal goes to these components:

- APU generator control unit - opens the APU generator breaker
- APU control unit - shuts down the APU.

When you turn the fire warning handle switch right or left, 28v dc goes to the APU extinguisher bottle. This causes the APU fire extinguisher bottle squib to release the halon.

You get the same results when you use the APU remote control panel P28. When you pull the fire handle switch on the P28 panel, a signal goes to these components:

- APU generator control unit - opens the APU generator breaker
- APU electronic control unit - shuts down the APU.

The bottle discharge switch also arms.

The bottle discharge switch sends 28v dc to the APU extinguisher bottle. This causes the APU extinguisher bottle squib to release the halon.

When the APU fire extinguisher bottle pressure is less than 250 psi, the pressure switch makes the amber APU BOTTLE DISCHARGED light on the engine and APU fire control panel come on.

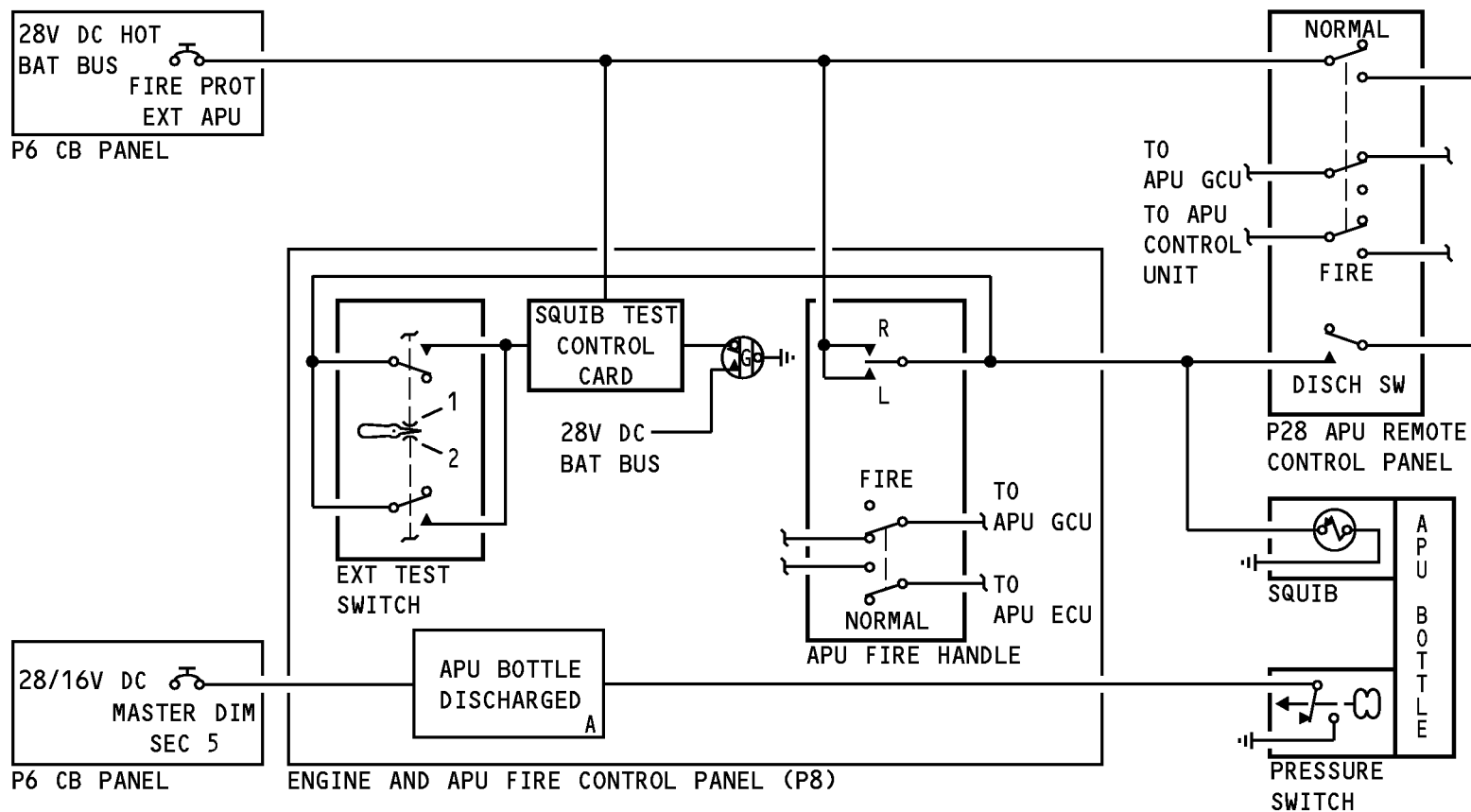
Extinguisher Bottle Squib Test

You do a test of the APU fire extinguisher bottle squib with the EXT TEST switch on the engine and APU fire control panel. The switch in position 1 or 2 sends low voltage to the APU squib. If there is continuity through the squib, the green light comes on. When you release the test switch, the light goes out.

NOTE: You do a test of the engine fire extinguisher bottle squibs from positions 1 and 2.

Training Information Point

The fire extinguishing system is connected to the 28v dc hot battery bus. Any time you operate the APU fire handle switches, the APU fire extinguisher bottle discharges.



FIRE PROTECTION - APU FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

EFFECTIVITY
HAP ALL

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - INTRODUCTION

Purpose

The cargo compartment fire extinguishing system extinguishes fires in these cargo compartments.

- Forward
- Aft.

General Description

The lower cargo fire compartment extinguishing system has these components:

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

- One fire extinguishing bottle.

HAP 048, 050, 053, 054

- Two fire extinguishing bottles.

HAP ALL

- Five discharge nozzles.

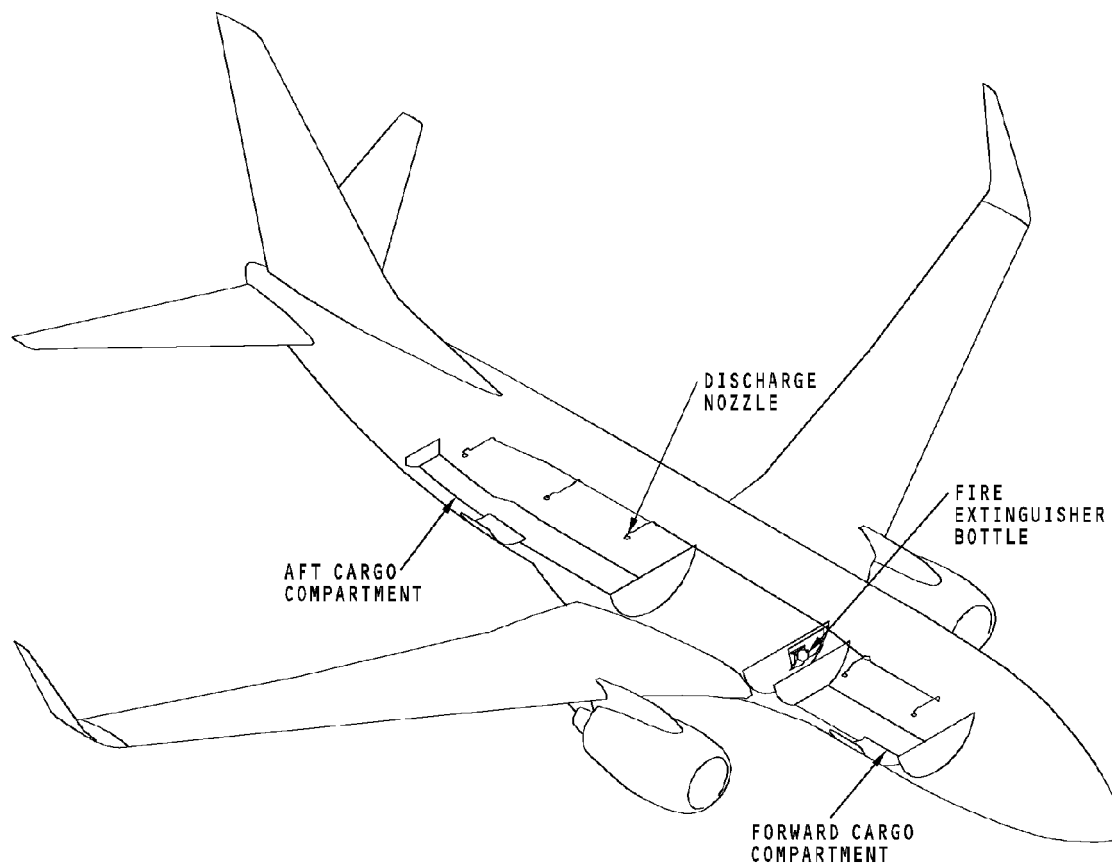
HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

The fire extinguishing bottle contains halon 1301 fire extinguishing agent pressurized with nitrogen. Tubing connects the bottle to the discharge nozzles in the cargo compartment ceilings.

HAP 048, 050, 053, 054

The fire extinguishing bottles contain halon 1301 fire extinguishing agent pressurized with nitrogen. Tubing connects the bottles to the discharge nozzles in the cargo compartment ceilings.

HAP ALL



FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - INTRODUCTION

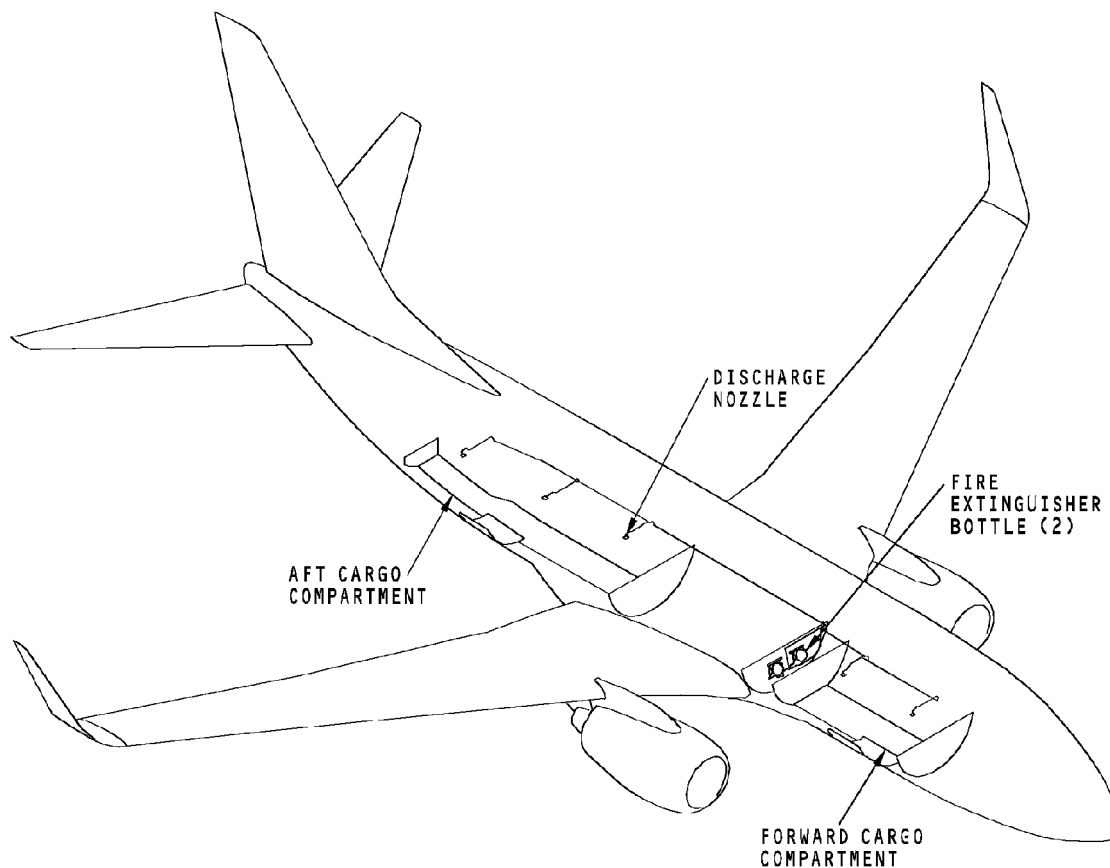
EFFECTIVITY

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - INTRODUCTION

EFFECTIVITY
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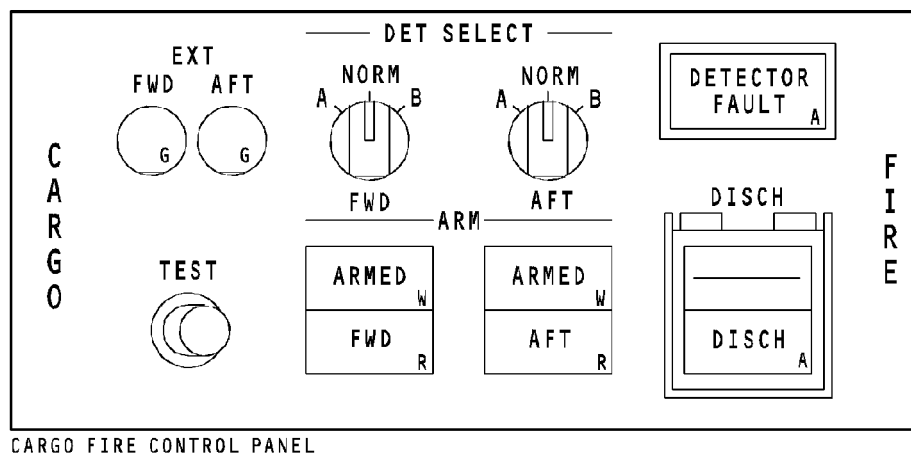
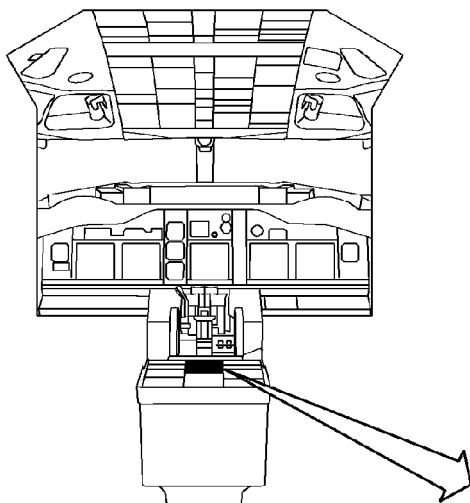
FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - OPERATION

Operation

To operate the cargo compartment fire extinguishing system you do these things:

- Push the related cargo fire warning switchlight
- Lift the guard to the DISCH switchlight
- Push the DISCH switchlight for a minimum of 1 second.

For more information on the cargo fire control panel, see cargo compartment smoke detection. (SECTION 26-16)



FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - OPERATION

EFFECTIVITY
HAP ALL

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - COMPONENT LOCATION

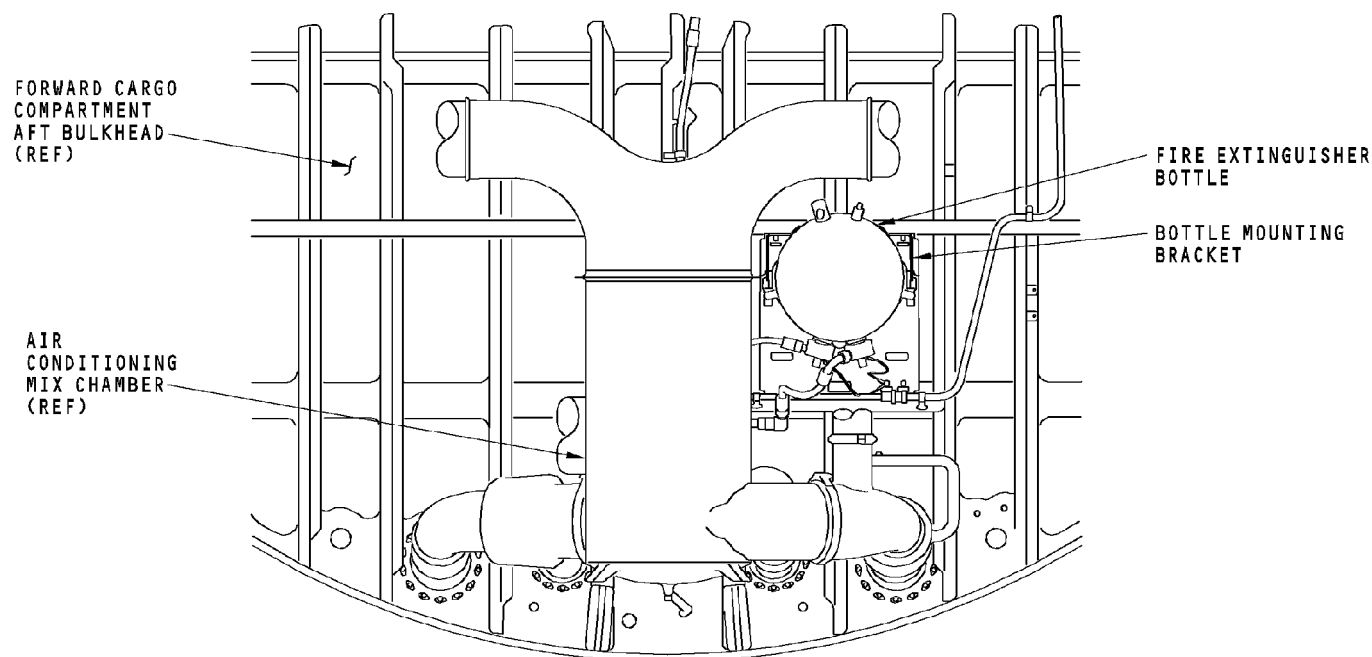
Component locations**HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999**

The cargo compartment fire extinguishing bottle is in the air conditioning distribution bay. The bottle is on the left side of the air conditioning mix chamber. It attaches to bracket on the aft bulkhead.

HAP 048, 050, 053, 054

The cargo compartment fire extinguishing bottles are in the air conditioning distribution bay. The bottles are on the left and right sides of the air conditioning mix chamber. The bottles attach to brackets on the aft bulkhead.

HAP ALL



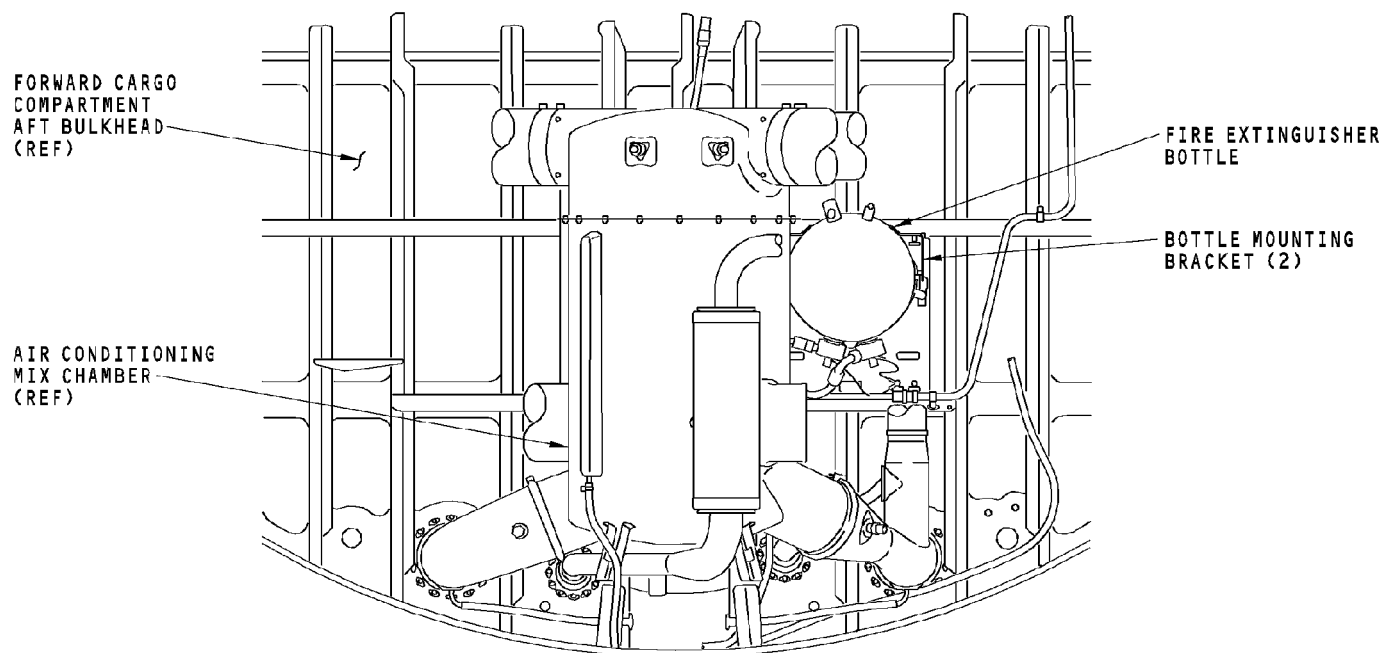
FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - COMPONENT LOCATION

EFFECTIVITY
HAP 101-999

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - COMPONENT LOCATION

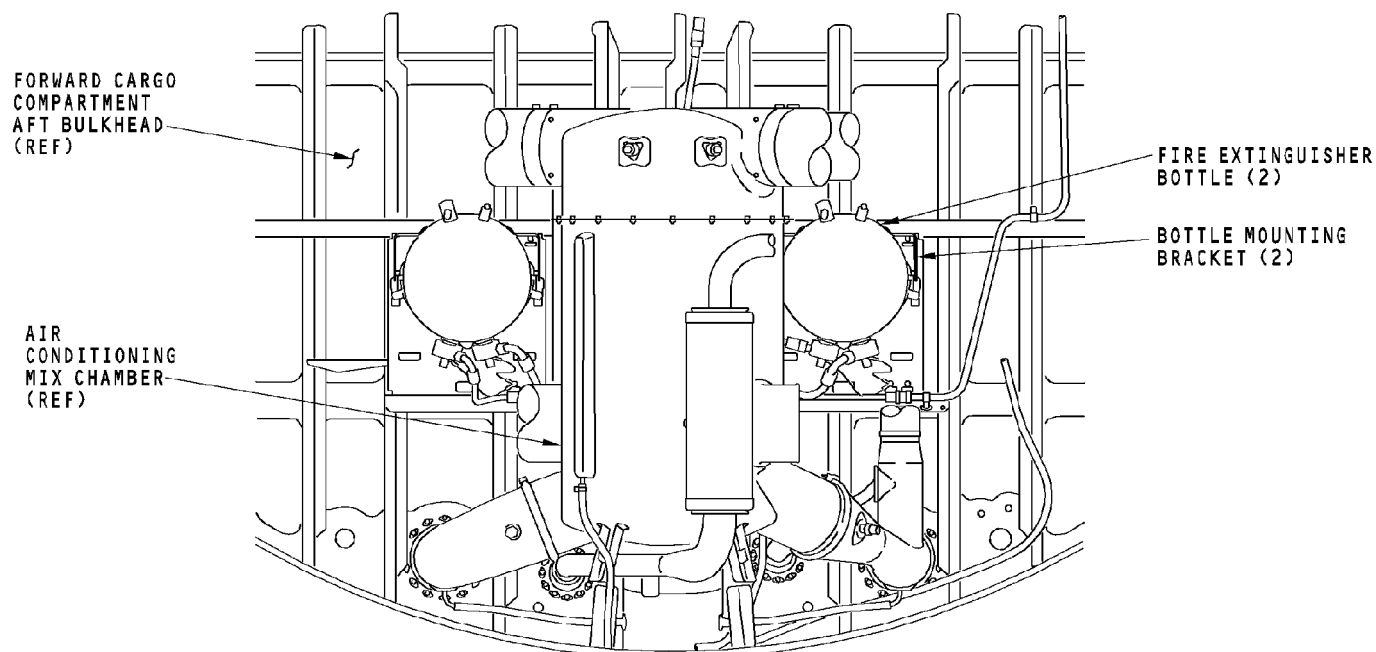
EFFECTIVITY

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - COMPONENT LOCATION

EFFECTIVITY
HAP 048, 050, 053, 054

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FIRE EXTINGUISHING BOTTLE

Physical Description

The bottle contains halon fire extinguishing agent pressurized with nitrogen.

The fire extinguishing bottle has these components:

- Safety relief and fill port
- Two handles
- Pressure switch with test button
- Stowage for the electrical protective caps for the squibs.

Location**HAP 048, 050, 053, 054**

The fire bottles are in the air conditioning distribution bay.

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

The fire bottle is in the air conditioning distribution bay.

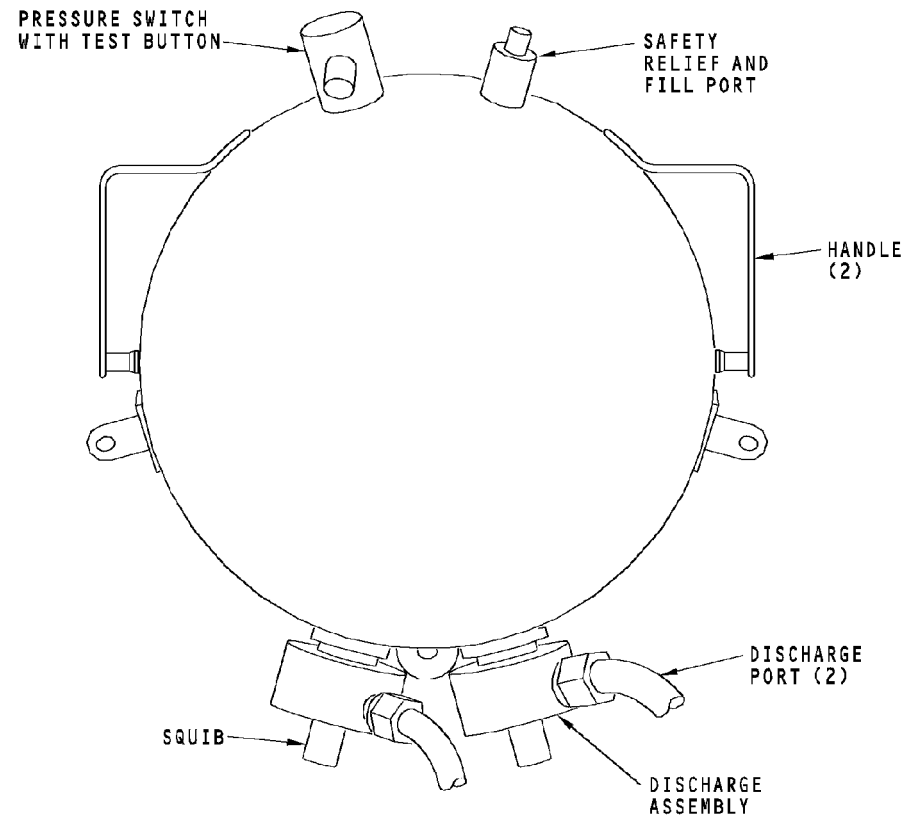
HAP ALL**Functional Description**

The discharge assembly has an explosive squib that releases the halon through the discharge port.

The pressure switch monitors the pressure in the bottle. When the bottle pressure is less than 250 psi, the switch sends a signal to the flight compartment and the amber DISCH light comes on.

The pressure switch test is by a push of the test button on the switch. This simulates low pressure and sends a signal to the flight compartment and the amber DISCH light comes on.

The safety relief and fill port is a fitting on the bottle. The safety relief opens to make sure the bottle does not break if internal pressure is too high.



FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FIRE EXTINGUISHING BOTTLE

EFFECTIVITY
HAP ALL

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FILTER DRIER**Purpose**

The filter drier removes moisture, filters debris, and meters the flow of halon during release from cargo fire extinguishing bottle 2.

Physical Description

The filter driers are metal. They contain these components:

- Metering orifice
- Desiccant granules
- Filter.

Location

The two filter driers are in the distribution bay. Each cargo fire extinguishing bottle 2 discharge line contains one filter drier.

Functional Description

The filter drier meters the halon gas so that the halon level in the compartment stays above 3% for 195 minutes. The filter drier uses desiccant granules to remove moisture. It has a filter to remove squib debris or other contaminants to prevent line blockage.

Training Information Point

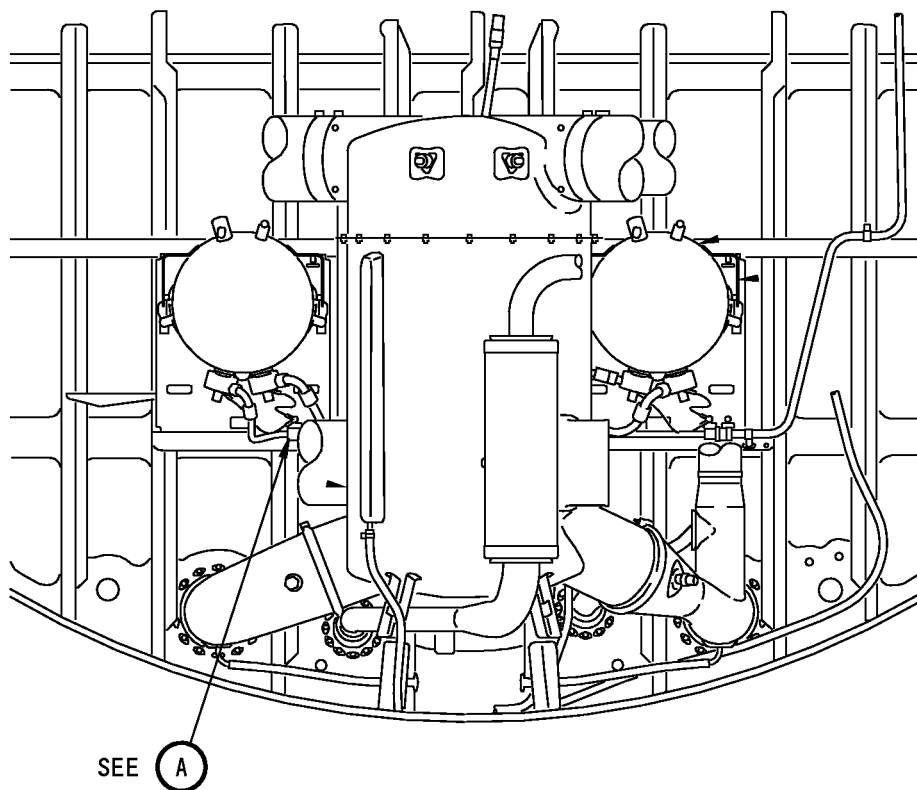
The filter drier has environmental seals on both sides of the component that rupture upon discharge. A check of the forward or aft cargo fire extinguishing discharge lines must be done downstream of the filter drier.

EFFECTIVITY
HAP 048, 050, 053, 054

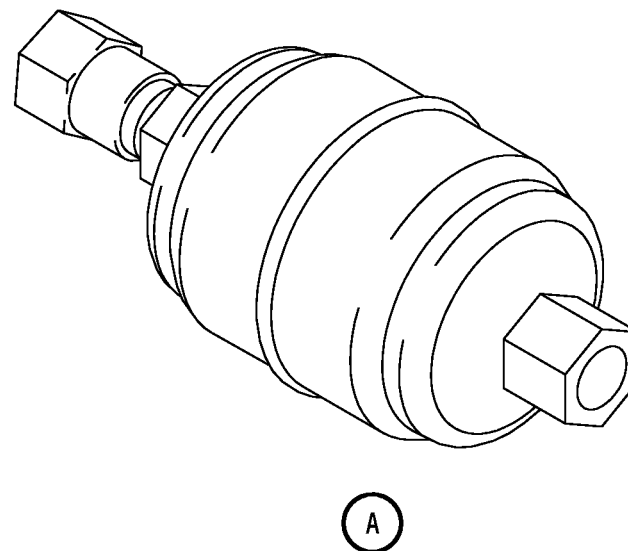
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DISTRIBUTION BAY



FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FILTER DRIER

EFFECTIVITY
HAP 048, 050, 053, 054

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

Functional Description

When you push a cargo fire arm switch, you select the related squib. If you push the discharge switch for one second, 28v dc goes to the squib. Then the bottle discharges extinguishing agent to the related cargo compartment. The bottle provides fire suppression for 60 minutes.

HAP 048, 050, 053, 054

Pushing the discharge switch starts the 60 minute timer. If the airplane is in flight, after 60 minutes, the second metered bottle begins discharging to the same cargo compartment. The two bottles together provide enough agent to provide over 180 minutes of fire suppression. The discharge system is inhibited if the airplane lands before the timer 60 minutes are over.

HAP ALL

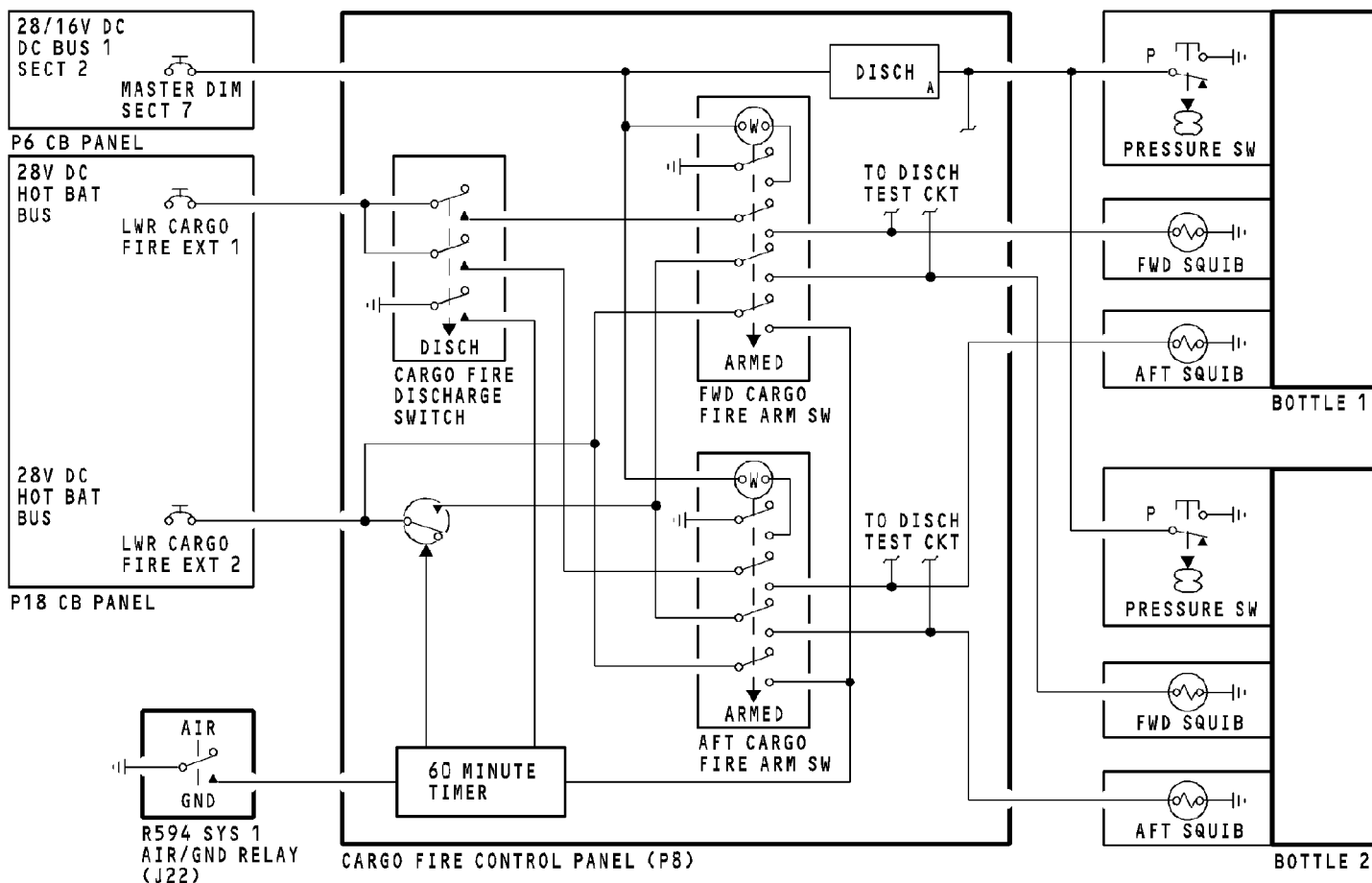
When the pressure in a bottle decreases, the bottle pressure switch closes and makes a ground. The amber DISCH light comes on.

HAP 048, 050, 053, 054

Training Information Point

CAUTION: IF THE AIRPLANE LANDS WITHIN 60 MINUTES OF DISCHARGING THE FIRST EXTINGUISHING BOTTLE, ALL FIRE DETECTION/SUPPRESSION CIRCUIT BREAKERS MUST BE PULLED AND RESET. FAILURE TO COMPLY WILL ALLOW THE AUTOMATIC DISCHARGE TIMER TO CONTINUE THE COUNT DOWN RESULTING IN AUTOMATIC DISCHARGE OF THE SECOND EXTINGUISHING BOTTLE DURING THE NEXT TAKEOFF.

HAP ALL



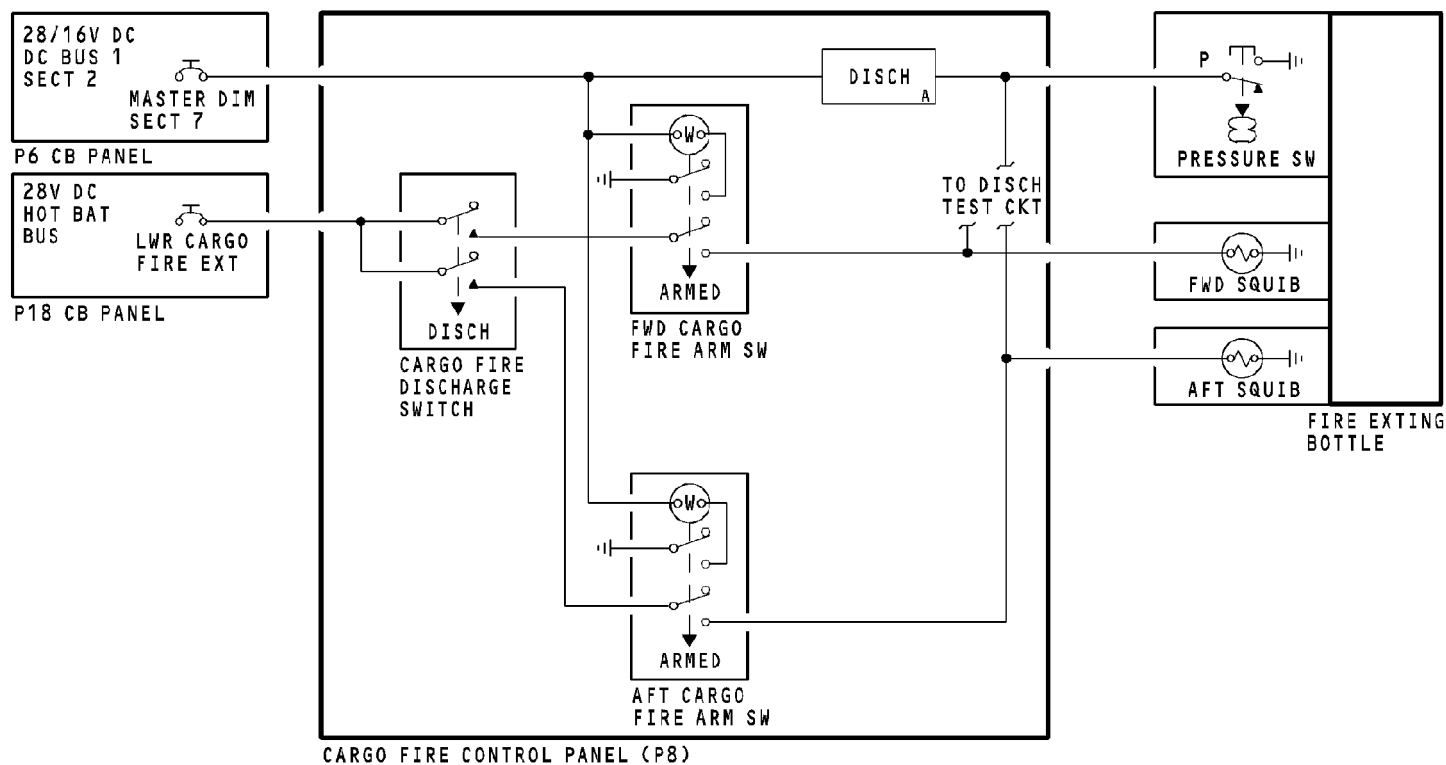
FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

EFFECTIVITY
HAP 048, 050, 053, 054

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - FUNCTIONAL DESCRIPTION

EFFECTIVITY

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - CARGO FIRE CONTROL PANEL - SQUIB TEST

Functional Description

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

The squibs on the fire bottle connect to the EXT lights on the cargo fire control panel.

HAP 048, 050, 053, 054

The squibs on both fire bottles connect to the EXT lights on the cargo fire control panel.

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

The TEST switch on the cargo fire control panel lets you do a test of the fire bottle squibs. It lets you find a squib fault.

HAP 048, 050, 053, 054

The TEST switch on the cargo fire control panel lets you do a test of both fire bottle squibs. It lets you find a squib fault.

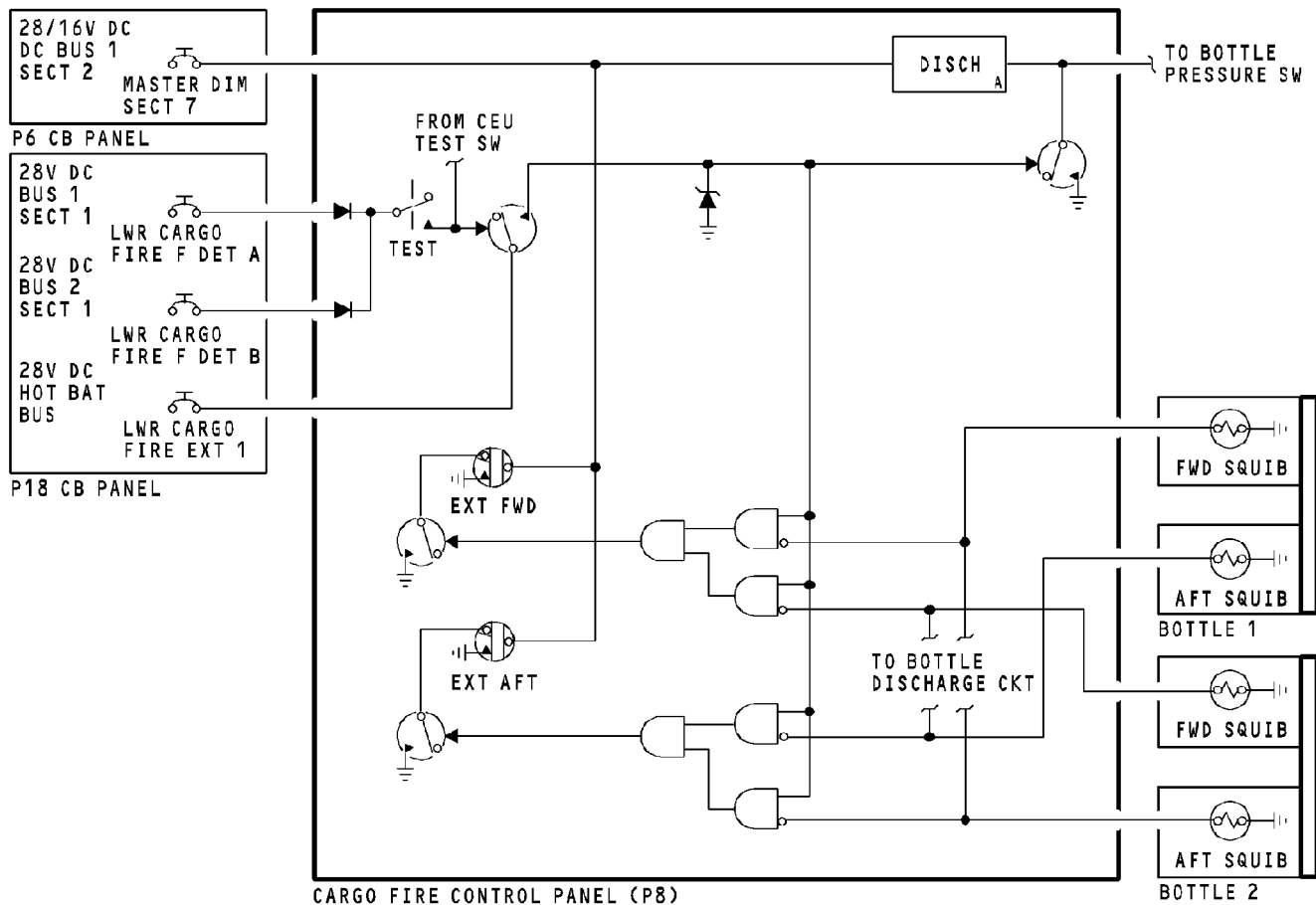
HAP ALL

The TEST switch on the cargo fire control panel lets you do a test of all three fire bottle squibs. It lets you find a squib fault.

If a squib has a fault, the extinguisher light will not come on.

Training Information Point

The lights are press-to-test. The DISCH amber light is not press-to-test.



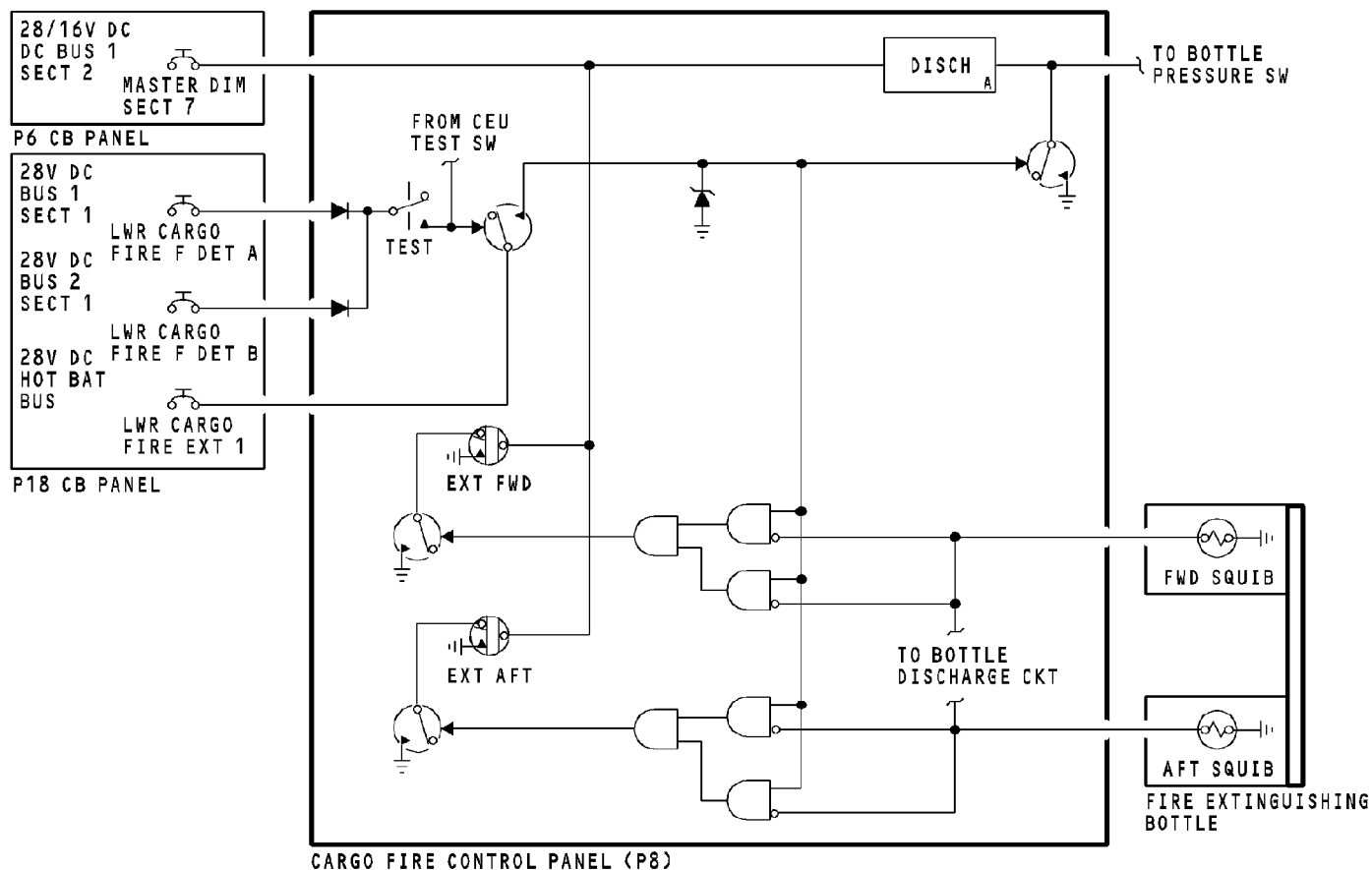
FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - CARGO FIRE CONTROL PANEL - SQUIB TEST

EFFECTIVITY
HAP 048, 050, 053, 054

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FIRE PROTECTION - CARGO COMPT FIRE EXTINGUISHING - CARGO FIRE CONTROL PANEL - SQUIB TEST

EFFECTIVITY

HAP 001-013, 015-026, 028-047, 049, 051, 052, 101-999

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FIRE PROTECTION - LAVATORY FIRE EXTINGUISHING - LAV FIRE EXTING BOTTLE AND TEMP INDICATOR**Purpose**

The lavatory fire extinguishing system extinguishes fires under the wash basin and trash bin area.

Physical Description

The lavatory extinguishing system has these components:

- Fire extinguisher bottle
- Temperature indicators.

Location

The lavatory fire extinguishing systems are in the lavatories under the wash basin.

Operation

The extinguisher bottle has two discharge ports. The ports have eutectic plugs. These plugs melt at high temperatures. When there is an overheat or fire condition, this occurs:

- Temperature indicators change color (white to black)
- Eutectic plug melts
- Extinguisher releases halon to stop the fire.

Training Information Point

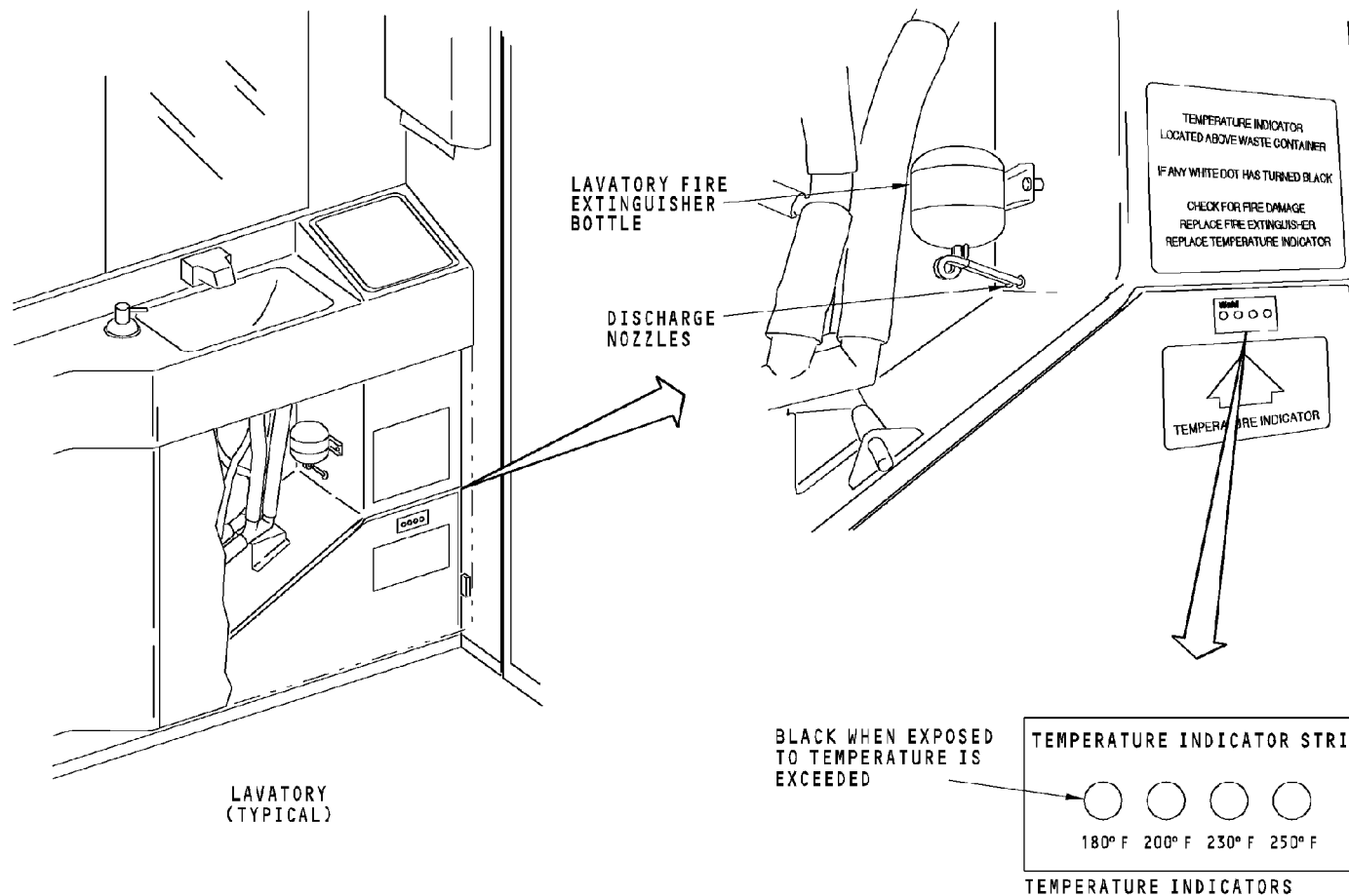
You must weigh the lavatory extinguisher bottle at regular intervals.

EFFECTIVITY
HAP ALL

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FIRE PROTECTION - LAVATORY FIRE EXTINGUISHING - LAV FIRE EXTING BOTTLE AND TEMP INDICATOR

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EFFECTIVITY
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FIRE PROTECTION - PORTABLE FIRE EXTINGUISHING

Purpose

There are portable fire extinguishers to extinguish fires inside the airplane. There are two types of extinguishers, water-type and halon. The water-type extinguishers are for solid combustible fires. The Halon extinguishers are for electrical and flammable liquid fires.

Location

There are extinguishers in these areas:

- Flight compartment
- Galley
- Passenger compartment.

Placards identify all of the extinguisher locations.

Physical Description

The water-type extinguishers contain a water and anti-freeze mixture. Each water extinguisher has these parts:

- Trigger (discharge valve)
- Water cylinder
- Handle with internal gas cartridge
- Discharge nozzle
- Quick-release mounting strap.

Each Halon extinguisher has these parts:

- Pressure indicator

- Halon cylinder
- Trigger
- Discharge nozzle
- Handle lock pin
- Handle.

Operation

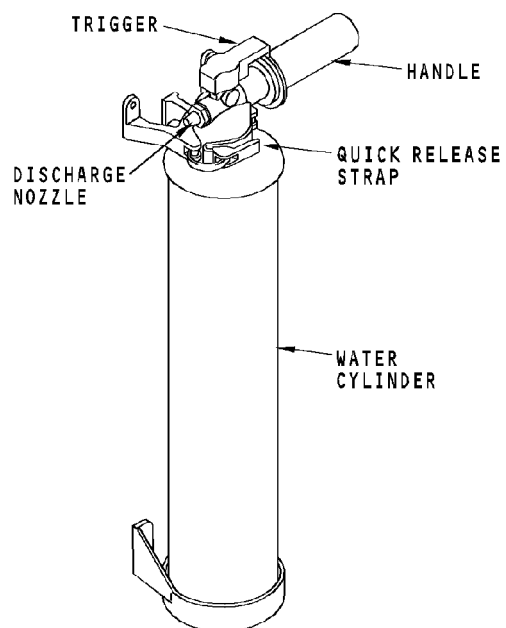
To operate the water-type extinguisher, turn the handle and push the trigger.

To operate the Halon extinguisher, remove the handle lock pin and push the handle.

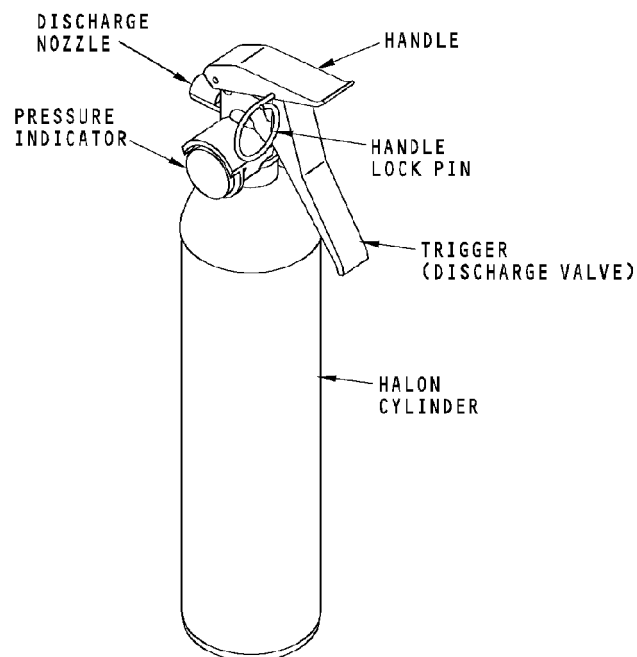
Training Information Point

After you use the water-type extinguisher, you must fill it again and replace the cartridge.

If the handle lock pin on the Halon extinguisher is not there, you must weigh the extinguisher to find if it is full. The pressure indicator is not a satisfactory check of the extinguisher.



WATER-TYPE FIRE EXTINGUISHER



HALON FIRE EXTINGUISHER

FIRE PROTECTION - PORTABLE FIRE EXTINGUISHING

EFFECTIVITY
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